STERIS®
Maintenance Manual

RELIANCE™ 120/220 Series
Hospital Cart Washers

- 120/120L
- 220/220L

(4/29/94)

P-764323-286

LIMITATIONS AND LIABILITY AND INDEMNITY

In no case, whether as a result of a Breach of Contract, Breach of Warranty or Tort (including STERIS's or customer's willful acts or negligence or strict liability) shall STERIS or customer be liable to the other for any consequential or incidental damages incurred by the other, including, but not limited to, loss of revenue, profits or goodwill. However, nothing contained in this agreement is intended to relieve either STERIS or customer from claims, liability, damages or expenses resulting from bodily injury, including death, or from property damage incurred due to the willful acts, the negligence of or the strict liability of that party.

STERIS agrees to defend, indemnify and hold customer harmless from any and all claims, liability, damages or expenses due to personal injuries, including death, to employees of STERIS and customer and to third parties and for property damage to the extent of the willful acts of the negligence of STERIS or the strict liability of STERIS caused by the acts or omissions of STERIS. Customer agrees to defend, indemnify and hold STERIS harmless from any and all claims, liability, damages or expenses due to personal injuries, including death, to employees of customer and STERIS and to third parties and from property damage to the extent of the willful acts or the negligence of customer or the strict liability of customer caused by the acts or omissions of customer.

WARNING — COPYING PROHIBITED

This manual is protected by Federal Copyright Law, which provides for damages of up to $20,000, as well as criminal fines and imprisonment, for unauthorized copying.

Table of Contents

TITLE	PAGE
SECTION 1: SUMMARY OF SAFETY WARNINGS AND CAUTIONS/GENERAL INFORMATION	1-1
1.1 GENERAL	1-3
SECTION 2: OPERATING INSTRUCTIONS	2-1
2.1 BEFORE OPERATING EQUIPMENT	2-1
2.2 CONTROLS	2-1
2.2.1 Front (Soiled-side) Control Panel	2-1
2.2.2 Back (Clean-side) Control Panel (Optional Double-door Units)	2-4
2.3 SET CYCLE PHASES	2-5
2.4 OPERATION	2-6
2.5 SHUTDOWN	2-8
SECTION 3: PRINCIPLES OF OPERATION	3-1
3.1 GENERAL	3-1
3.2 CYCLE DESCRIPTION	3-1
SECTION 4: INSPECTION AND MAINTENANCE	4-1
4.1 CLEANING PROCEDURES	4-1
4.1.1 Daily Cleaning	4-2
4.1.2 Weekly Cleaning	4-2
4.1.3 Monthly Cleaning	4-3
4.1.4 Quarterly Cleaning	4-3
4.1.5 Yearly Cleaning	4-3
4.2 MAINTENANCE	4-4
4.2.1 Monthly Maintenance	4-4
4.2.2 Semi-annually Maintenance	4-5
4.2.3 Yearly Maintenance	4-5
4.3 PREVENTIVE MAINTENANCE GUIDE	4-7
SECTION 5: FIELD TEST PROCEDURE	5-1
5.1 GENERAL	5-1
5.2 TEST INSTRUMENTATION REQUIRED	5-1
5.3 PRELIMINARY CHECKS	5-1
5.4 CYCLE TEST	5-2
5.5 CLEANUP	5-6
SECTION 6: TROUBLESHOOTING	6-1
6.1 TROUBLESHOOTING CHART	6-1
6.2 SCHEMATICS	6-8
SECTION 7: COMPONENT REPAIR, REPLACEMENT AND ADJUSTMENT	7-1
7.1 GENERAL	7-1
7.2 CONTROL	7-1
7.2.1 Recommended Electrostatic Damage (ESD) Precautions	7-1
7.2.2 Preparing Control For Service	7-1

This document is intended for the exclusive use of AMSCO and its customers. Reproduction in whole or in part is prohibited.

©1990–1994 AMSCO. All rights reserved.

Table of Contents (continued)

SECTION	TITLE	PAGE
7.2.3	Intermediary PC Board Replacement	7-2
7.2.4	Control PC Board Replacement	7-6
7.2.5	Control Panel Assembly Replacement	7-7
7.2.6	Principal PC Board Replacement	7-8
7.2.7	Interface (I/O) Board Repair/Replacement	7-10
7.3	DOOR(S)	7-11
7.3.1	Microswitch Replacement and Adjustment	7-11
7.3.2	Window and Window Gasket Replacement	7-12
7.4	WASH CHAMBER	7-13
7.4.1	Water Level Switch Adjustment	7-13
7.4.2	Water Level Switch Insulator Replacement	7-13
7.5	DETERGENT (OR RINSE AGENT) INJECTION PUMP	7-13
7.5.1	Roller Block Assembly Replacement	7-13
7.5.2	Detergent/Rinse Agent Pump Motor Replacement	7-14
7.6	TRAVELLING SPRAY MANIFOLD FRICTION CLUTCH ADJUSTMENT	7-15
7.7	RECIRCULATING PUMP	7-16
7.7.1	Pump Replacement	7-16
7.7.2	O-Ring Replacement	7-16
7.7.3	Seal Replacement	7-17
7.8	VALVES	7-17
7.8.1	Diverter Drain Valve	7-18
7.8.2	2-1/2" Solenoid Valve	7-20
7.8.3	Water and Steam Solenoid Valve	7-22
7.9	WATER TEMPERATURE BOOSTER TANK	7-23
7.9.1	Water Level Switch Adjustment	7-23
7.9.2	Water Level Switch Insulator Replacement	7-24
7.9.3	Thermostat Replacement	7-24
7.10	DRYING PACKAGE	7-24
7.10.1	Thermostat Replacement	7-24
7.10.2	Thermostat Adjustment	7-25
7.10.3	Motor and Belt Replacement	7-25
SECTION 8: EXPLODED VIEWS AND PARTS LISTS		**8-1**

List of Tables

TABLE	TITLE	PAGE
2-1	STANDARD PRE-PROGRAMMED (DEFAULT) CYCLE PHASE SETTINGS	2-3
4-1	DETERGENT/CLEANING PRODUCTS	4-1
4-2	PREVENTIVE MAINTENANCE GUIDE	4-7
5-1	STANDARD PRE-PROGRAMMED (DEFAULT) CYCLE PHASE SETTINGS	5-2
6-1	TROUBLESHOOTING CHART	6-1
6-2	SCHEMATIC REFERENCE LIST	6-8
6-3	WIRE COLOR CODING - WIRING SCHEMATICS	6-8
7-1	INTERMEDIARY BOARD DIP SWITCHES AND RESISTORS	7-3
7-2	DS1 SETTINGS	7-4
7-3	DS2 SETTINGS	7-4
7-4	DS3 SETTINGS	7-4
7-5	DS4 SETTINGS	7-4
7-6	DS7 SETTINGS	7-4
7-7	DS5 SETTINGS	7-5
7-8	DS6 SETTINGS	7-5
7-9	DS1 SETTINGS - PRINCIPAL BOARD	7-9
7-10	DS2 SETTINGS - PRINCIPAL BOARD	7-9

List of Illustrations

FIGURE	TITLE	PAGE
2-1	PLACE PICKUP TUBE AND SENSOR IN CONTAINER	2-1
2-2	FRONT (SOILED-SIDE) CONTROL PANEL	2-2
2-3	PRIMARY CONTROLS	2-3
2-4	CYCLE PHASE CONTROLS	2-3
2-5	BACK (CLEAN-SIDE) CONTROL PANEL	2-4
2-6	SET CYCLE PHASES	2-4
2-7	TURN POWER SWITCH TO ON	2-6
2-8	FLIP DETERGENT SUPPLY ALARM SWITCH TO ON	2-6
2-9	CYCLE STATUS	2-7
3-1	INTERFACE (I/O) BOARD	3-1
4-1	CLEAN CHAMBER FILTERS	4-1
4-2	CLEAN TRAVELLING SPRAY MANIFOLD NOZZLES	4-2
4-3	CLEAN TRAVELLING SPRAY MANIFOLD HOSE FILTER	4-2
4-4	CLEAN SLIDING INLET FILTER	4-2
4-5	CONDENSER ACCESS PANEL	4-3
4-6	CHECK GEAR BOX OIL LEVEL	4-4
4-7	MANUALLY OPERATE SAFETY CABLE LIMIT SWITCH	4-4
4-8	LUBRICATE DRYER BLOWER BEARINGS	4-5
4-9	REPLACE SQUEEZE TUBES	4-5
5-1	CHECK OPERATION OF VALVES	5-1
5-2	CHECK TRANSFER VALVE ON WATER TEMPERATURE BOOSTER TANK	5-1
5-3	CHECK GEAR BOX OIL LEVEL	5-2
5-4	SET CYCLE PHASES	5-3
5-5	FLIP DETERGENT SUPPLY ALARM SWITCH TO ON	5-3
5-6	LIFT SENSOR OUT OF CONTAINER	5-3
5-7	MANUALLY OPERATE SAFETY CABLE LIMIT SWITCH	5-5
7-1	PREPARE CONTROL FOR SERVICE	7-1
7-2	POWER SUPPLY TOGGLE SWITCH	7-2
7-3	REMOVE PLASTIC BRACE	7-2
7-4	INTERMEDIARY PC BOARD	7-2
7-5	REMOVE CONTROL PANEL FROM HOUSING	7-6
7-6	SEPARATE CONTROL BOARD FROM OVERLAY	7-6
7-7	REMOVE PRINCIPAL BOARD	7-7
7-8	PRINCIPAL PC BOARD	7-8
7-9	CHECK JUMPER SETTINGS	7-8
7-10	INTERFACE (I/O) BOARD	7-10
7-11	CHECK JUMPER SETTINGS	7-10
7-12	DOOR WINDOW REPLACEMENT	7-12
7-13	WATER LEVEL SWITCH	7-13
7-14	DETERGENT/RINSE AGENT PUMP	7-14
7-15	ADJUSTING FRICTION CLUTCH	7-15
7-16	TILT PUMP CRADLE	7-17
7-17	DIVERTER VALVES	7-17
7-18	2-1/2" SOLENOID VALVE	7-20
7-19	DIAPHRAGM-TYPE SOLENOID VALVE	7-22
7-20	SOLENOID VALVE, EXPLODED VIEW	7-23

List of Illustrations (continued)

FIGURE	TITLE	PAGE
7-21	BOOSTER TANK WATER LEVEL SWITCH	7-23
7-22	BOOSTER TANK THERMOSTAT ADJUSTMENT	7-24
7-23	DRYER THERMOSTAT ADJUSTMENT	7-25
8-1	HOSPITAL CART WASHER, COMPLETE	8-2
8-2	DOOR AND CONTROL PANEL ASSEMBLIES, MODEL 120	8-4
8-3	DOOR AND CONTROL PANEL ASSEMBLIES, MODEL 220	8-6
8-4	SOLID-STATE CONTROL ASSEMBLY	8-8
8-5	ELECTRICAL BOX	8-10
8-6	FLOOR GRATES AND FILTERS	8-12
8-7	DETERGENT/RINSE AGENT INJECTOR ASSEMBLY	8-14
8-8	TRAVELLING SPRAY MANIFOLD ASSEMBLY, MODEL 120	8-16
8-9	TRAVELLING SPRAY MANIFOLD ASSEMBLY, MODEL 220	8-18
8-10	TRAVELLING SPRAY MANIFOLD MOTOR AND DRIVE ASSEMBLY	8-20
8-11	EMERGENCY SAFETY CABLE ASSEMBLY	8-22
8-12	WATER CIRCULATION PIPING ASSEMBLY	8-24
8-13	PUMP AND MOTOR ASSEMBLY	8-26
8-14	HOT WATER SUPPLY PIPING ASSEMBLY (Optional Booster Tank)	8-28
8-15	DIVERTER DRAIN VALVE ASSEMBLY	8-30
8-16	2-1/2" SOLENOID VALVE ASSEMBLY (Optional Booster Tank)	8-32
8-17	STEAM PIPING ASSEMBLY (Optional Booster Tank)	8-34
8-18	STEAM PIPING ASSEMBLY (Optional Steam Injection)	8-36
8-19	WATER CIRCULATION PIPING ASSEMBLY (Optional Cart System)	8-38
8-20	OPTIONAL NON-VENTED DRYING PIPING ASSEMBLY	8-40
8-21	OPTIONAL VENTED DRYING PACKAGE ASSEMBLY	8-42
8-22	DRYER BLOWER ASSEMBLY (Optional Drying Package)	8-44
8-23	DRYER THERMOSTAT (Optional Drying Package)	8-46
8-24	VENT OPTIONS	8-48
8-25	PUMP ASSEMBLY	8-50
8-26	DISTRIBUTION BOX ASSEMBLY	8-52

Section 1: Summary of Safety Warnings and Cautions and General Information

Following is a summary of the safety warnings and cautions which must be observed when operating or servicing this equipment. WARNINGS indicate **potential danger to personnel**, and CAUTIONS indicate **potential damage to equipment.** These precautions are repeated, where applicable, throughout the manual.

Observance of these safety precautions will minimize the risk of personal injury and/or the possibility of unit damage.

The operation and maintenance procedures recommended by AMSCO® are described in this manual. Only these recommended maintenance procedures should be followed.

WARNINGS!

WARNING: FALL HAZARD

FALL HAZARD—To prevent falls, keep floors dry. Promptly clean up any spills or drippage.

WARNING: BURN HAZARD

BURN HAZARD—After pressing STOP, wait until water flow stops before opening door. Hot water/steam may be sprayed through door opening if door is opened too soon.

BURN HAZARD—Allow piping to cool down before inspecting and/or cleaning supply-line strainers.

BURN HAZARD—Wear gloves and face protection and open door slowly if it is necessary to open door during a cycle. Hot water may be sprayed through door opening when checking automatic stop while washer is operating.

BURN HAZARD—Allow unit to cool down before performing any service on pump. Surface of motor and piping become very hot during unit operation.

BURN HAZARD—Allow unit to cool down before performing any service on pump. Piping and valves become very hot during unit operation.

WARNING: PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD

PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD—Regularly scheduled preventive maintenance, in addition to the faithful performance of the minor maintenance described below, is required for safe and reliable operation of this equipment. Contact AMSCO service to schedule preventive maintenance.

PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD—Only fully qualified service personnel should make repairs and adjustments to this equipment. Maintenance done by inexperienced, unqualified personnel or installation of unauthorized parts could cause personal injury, invalidate the warranty, or result in costly damage. Contact your AMSCO sales or service representative regarding service options.

WARNING: ELECTRIC SHOCK HAZARD

ELECTRIC SHOCK HAZARD—Lock building electrical supply switch to OFF before performing any service on unit.

WARNING: PERSONAL INJURY/BURN HAZARD

PERSONAL INJURY/BURN HAZARD—Keep chamber door(s) open when performing any maintenance inside chamber. When doors are closed, a cycle can be started at which time hot water would be sprayed into chamber.

Summary of Safety Warnings and Cautions (continued)

WARNING: CHEMICAL BURN/EYE INJURY HAZARD

CHEMICAL BURN/EYE INJURY HAZARD—Wear gloves and eye protection when replacing detergent/rinse agent squeeze tube(s). Residual detergent might remain in used squeeze tubes. If detergent/rinse agent contacts skin or eyes, immediately flush with running water for at least 10 minutes. If contact was with the eyes, seek medical attention.

WARNING: ELECTRIC SHOCK AND/OR BURN HAZARD

ELECTRIC SHOCK AND/OR BURN HAZARD—Lock building electrical supply disconnect switch to OFF position before performing any service on the unit. If unit is started during maintenance procedures, hot water/steam may be sprayed into washer.

ELECTRIC SHOCK AND/OR BURN HAZARD—Lock building electrical supply disconnect switch to OFF, close unit supply valves, and position power switch to OFF before performing any service on the unit. When power switch is ON, door switch(es) and valves are energized, and if cycle is started hot water/steam would enter piping.

ELECTRIC SHOCK AND/OR BURN HAZARD—Lock building electrical supply disconnect switch to OFF, close unit supply valves, and position power switch to OFF before performing any service on the unit. When power switch is ON valves are energized, and if cycle is started hot water/steam would enter piping.

WARNING: PERSONAL INJURY HAZARD

PERSONAL INJURY HAZARD—Lock building electrical supply disconnect switch to OFF and position power switch to OFF before performing any service on traveller assembly. When power is ON, motor can be started and chain drive movement could lead to injury.

CAUTIONS!

CAUTION:

- When choosing a detergent, use one with a low chloride content. Detergents with a high chloride content can be harmful to stainless steel.
- Use non-abrasive cleaners when cleaning the unit. Follow directions on containers and rub in back-and-forth motion (in same direction as surface grain). Abrasive cleaners will damage stainless steel. Cleaner rubbed in a circular motion or applied with a wire brush or steel wool on door and chamber assemblies can be harmful to stainless steel. Do not use these cleaners on painted surfaces.
- Always use a silicone lubricant to lubricate detergent and optional rinse agent squeeze tubes. Petroleum-based lubricants, such as Vaseline® or grease, will cause squeeze tubes to melt.
- Observe the Electrostatic Precautions outlined in Section 7.2.1. Always wear a grounding wrist strap when removing or replacing PC boards.
- Carefully tighten set screw. The metal set screw can easily strip the plastic threads in the roller block assembly.
- Make sure a cooling fan is attached to rear motor shaft on new motor. Check that fan blades are positioned to send airflow to motor. Motor will overheat without a cooling fan.
- Solenoid valves are equipped with a special material which can be attacked by oils and grease. When replacing entire valve, wipe threads clean of cutting oils and use Teflon® tape to seal pipe joints.

1.1 GENERAL

The product literature included in this section contains factual data relating to the principal characteristics of the Reliance 120/220 Hospital Cart Washers.

This literature is informative rather than instructional. It provides and conveys, through text and illustrations, a general concept of the equipment, its purpose, capabilities, limitations and technical specifications.

Section 2: Operating Instructions

2.1 BEFORE OPERATING EQUIPMENT

1. Check that building electrical supply disconnect switch (circuit breaker) is positioned to ON. Verify that steam and water supply valves are open.
2. Open chamber door and check that large filters are installed and clean. Verify suction filter is installed under large filters. Check that travelling spray manifold hose filter is clean and in place.

⚠ CAUTION:

- **When choosing a detergent, use one with a low chloride content. Detergents with a high chloride content can be harmful to stainless steel.**

NOTE: Always use a non-foaming detergent to assure that carts and, if unit is equipped with manifold utensil cart feature, glassware and utensils can be thoroughly rinsed. Detergents with a high chloride content should not be used, as chlorides are harmful to stainless steel. Follow manufacturer's recommendations for amount of detergent to be used.

AMSCO recommends that AMSCO ALKALINE DETERGENT, specially formulated for processing organic soils (blood, oils, fat, grease, proteins, glucose, etc.) be used. See Table 4-1, page 4-1, for ordering information.

3. Check detergent and, if applicable, rinse agent supplies (see Figure 2-1).
   a. Verify that low-level sensor is placed vertically in container.
   b. Check that pickup tube is placed in container and is full of detergent or rinse agent (primed). If tube is not primed, use the appropriate prime switch on the detergent/rinse agent pump box to fill tube.
   c. If detergent and/or rinse agent level is low, install a new container. First place low-level sensor into container, then pickup tube. Operate prime switch to fill pickup tube.

NOTE: Contact your AMSCO Service Representative if any adjustment of injection system is needed.

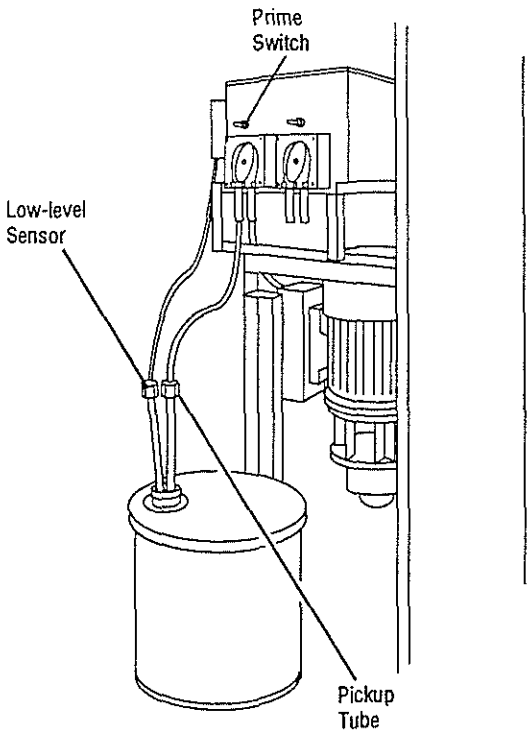


Figure 2-1. Place Pickup Tube and Sensor in Container

2.2 CONTROLS

Before operating the equipment, it is important to become familiar with the controls, their functions and the cycle options available. Read this section carefully and refer back to it when selecting cycle phases and setting cycle phase options.

2.2.1 Front (Soiled-side) Control Panel

The front (soiled-side) control panel consists of three system controls—**Power ON/OFF and Indicators, Detergent/Rinse Agent Supply Alarm ON/OFF Switch and Indicator,** and the **Main Control Panel** (see Figure 2-2).

1. **Power ON/OFF and Indicators,** located below the Main Control Panel, operate as follows:
   - **Power ON/OFF and Safety Cable RESET Switch**—turns on main power to unit. When power is ON, cycle phase controls turn on and phases can be selected or bypassed, changed, etc. If unit includes optional water temperature booster, storage tank fills with water and begins to heat. Switch includes a RESET position for resetting safety cable system. After chamber

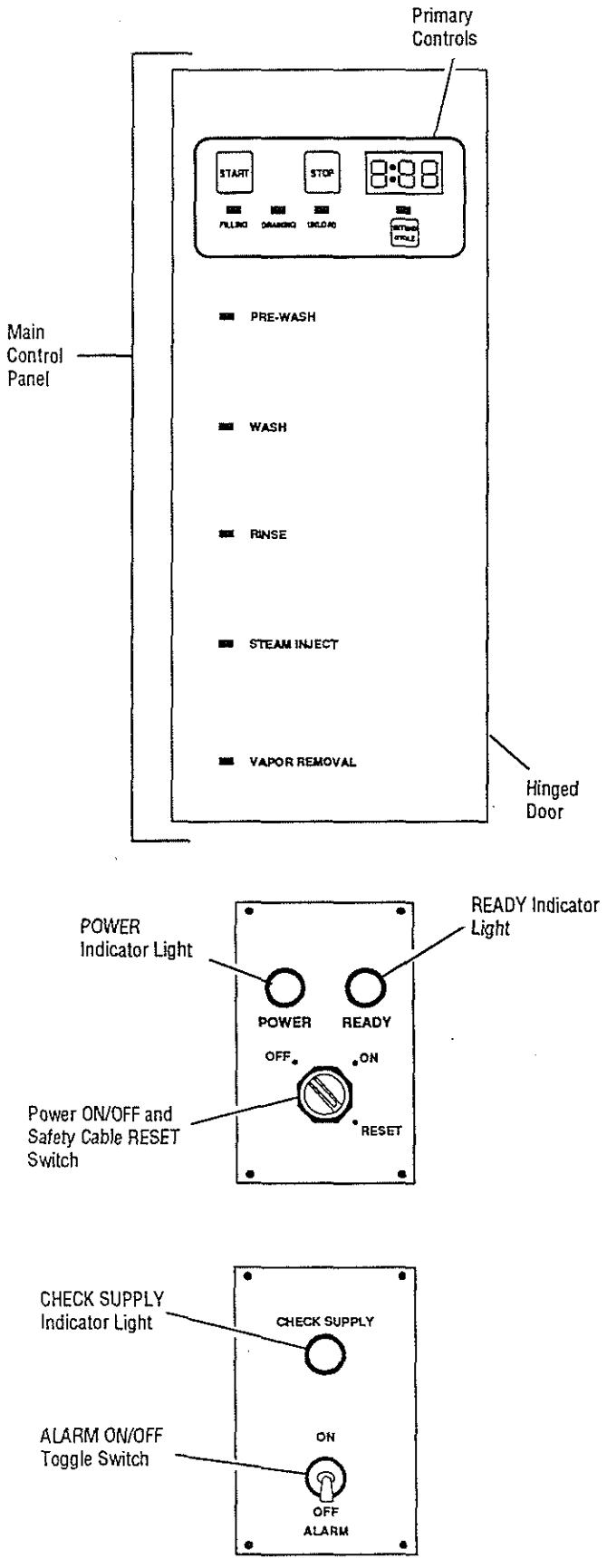


Figure 2-2. Front (Soiled-side) Control Panel

safety cable has been pulled, switch must be turned to RESET to reactivate safety cable. Switch is spring-loaded to automatically return to ON position when released, however START must be pressed to resume cycle.

- POWER Indicator Light—glows red whenever power is ON.
- READY Indicator Light—glows green when unit is ready to be loaded. If unit includes optional water temperature booster, then READY light glows when water in the booster tank reaches 180°F (82°C), otherwise READY light glows when unit power is ON. Cycle cannot be started until READY light glows green.

2. The **Detergent/Rinse Agent Supply ALARM ON/OFF Switch and Indicator**, located below the Power ON/OFF and Indicators, function as follows:
   - **ALARM ON/OFF Toggle Switch**—when positioned to ON, audibly alarms operator if detergent or optional rinse agent supply falls below low-level sensor.
   - **CHECK SUPPLY Indicator Light**—illuminates if detergent or optional rinse agent supply falls below low-level sensor.
3. The **Main Control Panel** consists of the **primary controls**, visible and accessible through a cutout in the hinged door, and the **cycle phase controls** located behind the hinged door.

   The **primary controls** (see Figure 2-3) consist of:
   - **START Touch Pad**—starts the cycle. If STOP touch pad has been pressed, pressing START resumes the cycle. Also, if safety cable has been pulled and power switch has been turned to RESET, pressing START resumes the cycle.
   - **STOP Touch Pad**—stops the cycle. Control retains, in memory, the cycle phases programmed and continues with selected program when START is pressed.
   - **Cycle Status Indicators**—light up to indicate cycle status—FILLING, DRAINING and UNLOAD.
   - **Timer Digital Readout**—displays and counts down time remaining in each cycle phase.
   - **EXTEND CYCLE Touch Pad**—when pressed, suspends initial time setting and causes phase in progress to continue until touch pad is pressed again. The phase then continues until initial time setting is expended.

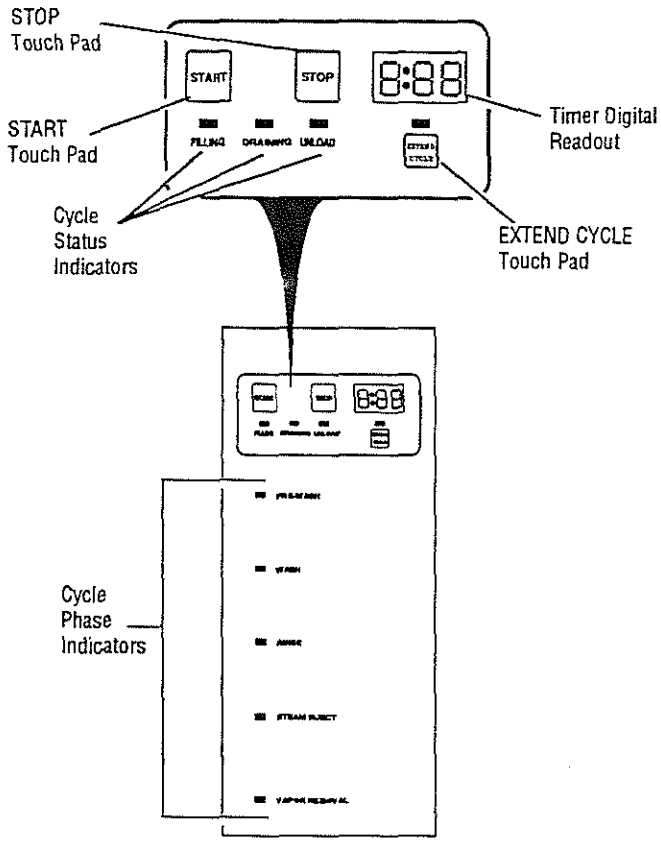


Figure 2-3. Primary Controls

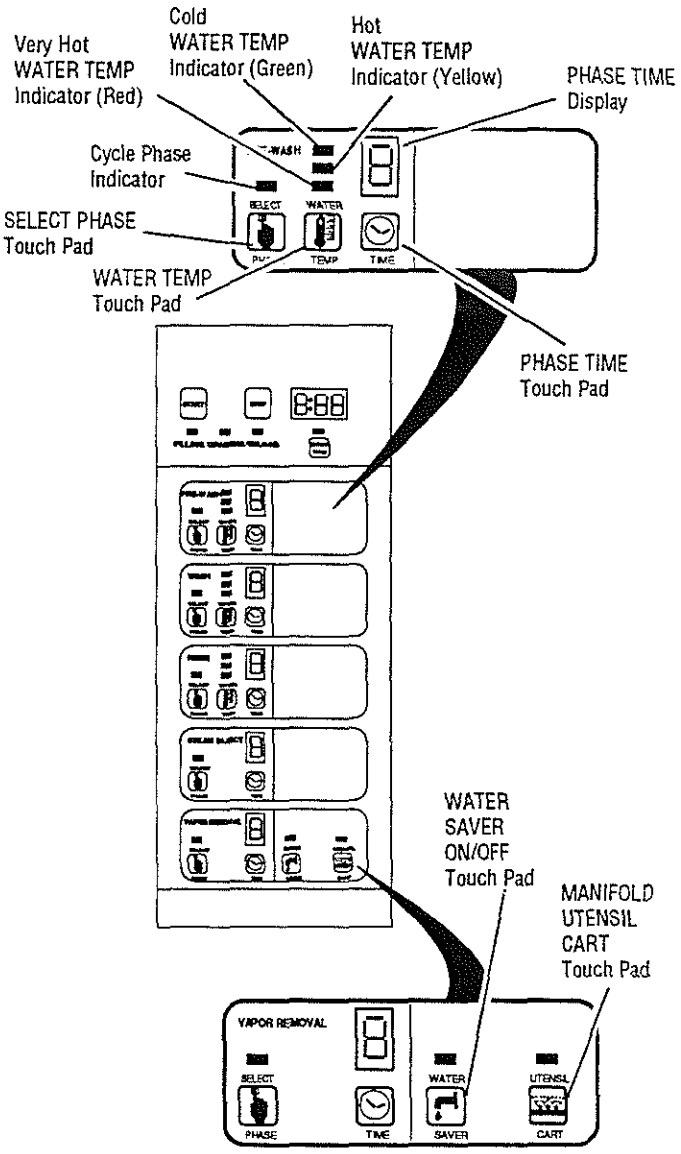


Figure 2-4. Cycle Phase Controls

Table 2-1. Standard Pre-programmed (Default) Cycle Phase Settings

PHASE	SELECT PHASE	WATER TEMP w/Booster Tank**	WATER TEMP w/o Booster Tank	PHASE TIME (min)
PRE-WASH	Selected	HOT	HOT	1
WASH	Selected	VERY HOT	HOT*	3
RINSE	Selected	VERY HOT	HOT*	2
STEAM INJ.**	Selected	N/A	N/A	3
VAPOR REM.	Selected	N/A	N/A	4
or DRYING**	Selected	N/A	N/A	8
WATER SAVER	Off	N/A	N/A	N/A
MANIFOLD CART**	Off	N/A	N/A	N/A

** If optional water temperature booster is not installed, then this setting provides very hot building-supply water - 180°F (82°C).*

*** Optional*

The cycle phase controls come on as soon as the power switch is turned to ON. At that time, the standard pre-programmed cycle phases are displayed (see Table 2-1).

NOTE: Changes made to the pre-programmed cycle remain in memory unless the power switch is turned to OFF or a power outage occurs. When this happens, the control returns to the standard pre-programmed cycle.

Cycle phase controls (see Figure 2-4) consist of:

- **SELECT PHASE Touch Pads** (one for each available phase)—select or deselect cycle phases. When phase is selected, PHASE indicator light is on. When phase is deselected (bypassed) indicator light is off.

- **WATER TEMPERATURE Touch Pads** (applicable phases only)—select desired water temperature—hot tap water or, if unit is equipped with water temperature booster option, 180°F (82°C) water. Each time the touch pad is pressed, one of the indicator lights above the touch pad lights up. The sequence is yellow for hot tap water, and red for 180°F (82°C) heated water. If touch pad is pressed again after red indicator light comes on, sequence cycles back to the yellow (hot tap water) indicator light.

NOTE: Depending on options available on the equipment, temperature selections for some phases cannot be changed from the factory default setting (i.e., if no water temperature booster is available, then very hot water option cannot be selected).

- **PHASE TIME Touch Pads** (one for each available phase)—set phase times from 0 to 9 minutes (a zero setting gives a phase time of 20 seconds). Each time the touch pad is pressed, the PHASE TIME display increases by one minute until nine is reached. Display restarts at zero if touch pad is pressed again after nine is displayed.
- **WATER SAVER ON/OFF Touch Pad**—when selected, causes the rinse water from the current cycle to be saved for use in PRE-WASH phase of following cycle.
- **MANIFOLD UTENSIL CART Touch Pad** (optional)—when selected, enables manifold cart coupling system operation.
- **Cycle Phase Indicators**—light up when phase is selected and flash as cycle progresses through various phases, i.e., when washer is in PRE-WASH phase, PRE-WASH indicator light flashes. Indicator lights are visible through cutouts in the hinged door.

2.2.2 Back (Clean-side) Control Panel (Optional Double-door Units)

The back (clean-side) control panel consists of four primary controls which operate as follows (see Figure 2-5):

- **START Pushbutton (green)**—starts the cycle. If STOP pushbutton has been pressed, pressing START resumes the cycle.
- **STOP Pushbutton (red)**—stops the cycle. Control retains, in memory, the cycle phases programmed and continues with selected program when START is pressed.
- *IN USE Indicator Light*—glows green while cycle is in progress.
- **UNLOAD Indicator Light**—glows red when cycle is complete and unit is ready to unload.

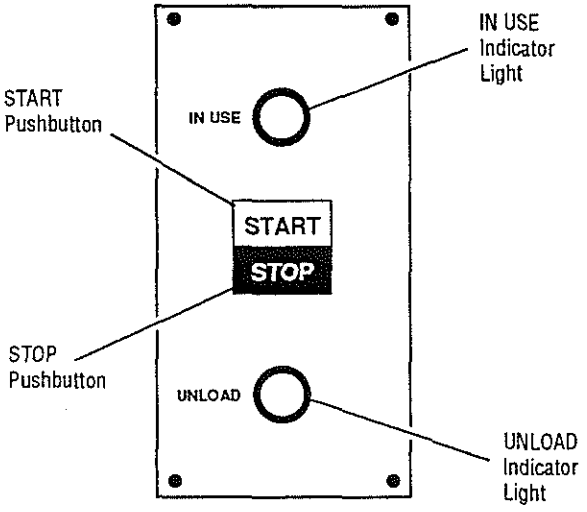


Figure 2-5. Back (Clean-side) Control Panel

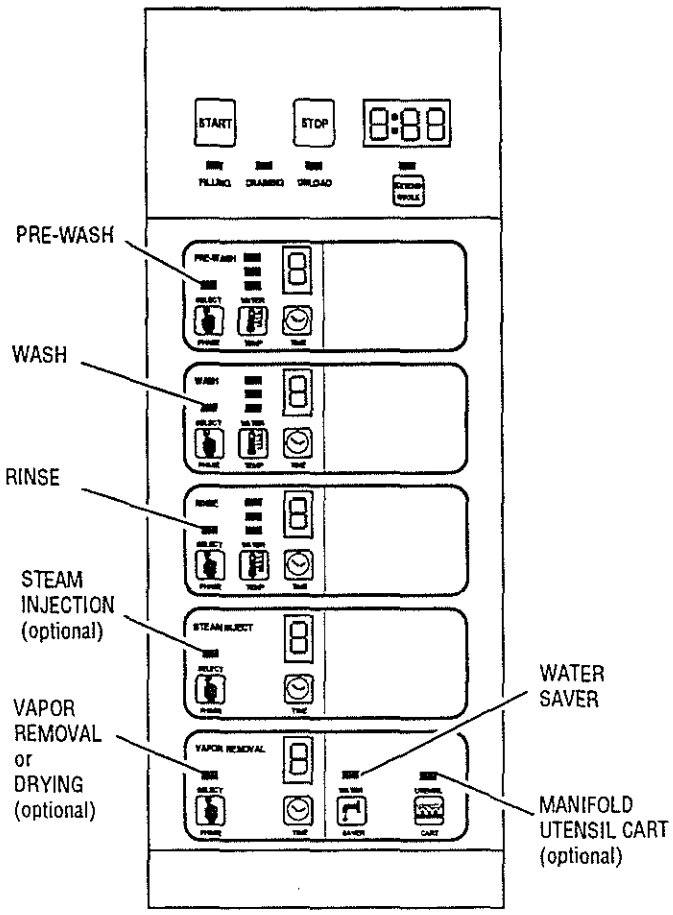


Figure 2-6. Set Cycle Phases

2.3 SET CYCLE PHASES

1. Position power switch to ON.
2. Open hinged door on main control panel.
3. Choose cycle phase settings as follows (Figure 2-6):

NOTE: All cycle phases are ON (selected) when power is turned ON. To turn phase OFF (bypass phase), press SELECT PHASE touch pad. To turn phase back on, press touch pad again.

- **PRE-WASH**

1) **If phase is selected (indicator light on)** and desired cycle setting calls for no PRE-WASH, press SELECT PHASE touch pad to bypass this phase. **If phase is deselected (indicator light off)** and desired cycle setting calls for PRE-WASH, press SELECT PHASE touch pad to select this phase.
2) Since **no water temperature selection is available for this phase,** pressing the WATER TEMPERATURE touch pad has no effect.
3) The **pre-set phase time is 1 minute.** To change setting, if desired, press the PHASE TIME touch pad to cycle through times available (0 to 9 minutes). Adjust time, as necessary, depending on soiled condition of load.

*NOTE: **A 0 (zero) setting gives 20 seconds.** If zero phase time is desired, bypass this phase entirely.*

- **WASH**

1) **If phase is selected (indicator light on)** and desired cycle setting calls for no WASH, press SELECT PHASE touch pad to bypass this phase. **If phase is deselected (indicator light off)** and desired cycle setting calls for WASH, press SELECT PHASE touchpad to select this phase.

NOTE: If building supply water cannot be provided at 180° F (82° C), then water temperature booster should be installed.

2) If water temperature booster option is installed, very hot, 180°F (82°C), water (red indicator light) is selected. If hot, 110°F (43°C) minimum, water is desired, press the WATER TEMPERATURE touch pad to select (yellow indicator light). If water temperature booster option is not installed, no selection is available for this phase. The hot water (yellow indicator light) is on and pressing the WATER TEMPERATURE touch pad has no effect.
3) The **pre-set time is 3 minutes.** To change setting, if desired, press the PHASE TIME touch pad to cycle through times available (0 to 9 minutes). Adjust time, as necessary, depending on soiled condition of load.

*NOTE: **A 0 (zero) setting gives 20 seconds.** If zero phase time is desired, bypass this phase entirely.*

- **RINSE**

1) **If phase is selected (indicator light on)** and desired cycle setting calls for no RINSE, press SELECT PHASE touch pad to bypass this phase. **If phase is deselected (indicator light off)** and desired cycle setting calls for RINSE, press SELECT PHASE touchpad to select this phase.

NOTE: If building supply water cannot be provided at 180° F (82° C), then water temperature booster should be installed.

2) If water temperature booster option is installed, very hot, 180°F (82°C), water (red indicator light) is selected. If hot, 110°F (43°C) minimum, water is desired, press the WATER TEMPERATURE touch pad to select (yellow indicator light). If water temperature booster option is not installed, no selection is available for this phase. The hot water (yellow indicator light) is on and pressing the WATER TEMPERATURE touch pad has no effect.
3) The **pre-set time is 2 minutes.** To change setting, if desired, press the PHASE TIME touch pad to cycle through times available (0 to 9 minutes). Adjust time, as necessary, depending on soiled condition of load.

*NOTE: **A 0 (zero) setting gives 20 seconds.** If zero phase time is desired, bypass this phase entirely.*

- **STEAM INJECTION (optional)**

1) **If phase is selected (indicator light on)** and desired cycle setting calls for no STEAM INJECTION, press SELECT PHASE touch pad to bypass this phase. **If phase is deselected (indicator light off)** and desired cycle setting calls for STEAM INJECTION, press SELECT PHASE touchpad to select this phase.
2) The **pre-set time is 3 minutes.** To change setting, if desired, press the PHASE TIME touch pad to cycle through times available (0 to 9 minutes).

*NOTE: **A 0 (zero) setting gives 20 seconds.** If zero phase time is desired, bypass this phase entirely.*

- **VAPOR REMOVAL or DRYING (optional)**

1) **If phase is selected (indicator light on)** and desired cycle setting calls for no VAPOR REMOVAL or no DRYING (if optional drying package is installed),

press SELECT PHASE touch pad to bypass this phase. **If phase is deselected (indicator light off)** and desired cycle setting calls for VAPOR REMOVAL or DRYING, press SELECT PHASE touchpad to select this phase.

2) The **pre-set time for VAPOR REMOVAL is 4 minutes. For optional DRYING, pre-set time is 8 minutes.** To change setting, if desired, press the PHASE TIME touch pad to cycle through times available (0 to 9 minutes).

*NOTE: **A 0 (zero) setting gives 20 seconds.** If zero phase time is desired, bypass this phase entirely.*

NOTE: The vapor removal system runs during the STEAM INJECTION phase (if option is installed and phase is selected), but the actual time countdown of the VAPOR REMOVAL phase, if selected, does not begin until STEAM INJECTION phase is completed.

- WATER SAVER ON/OFF

NOTE: Because water remains in the chamber after the RINSE phase when WATER SAVER is ON, drying performance (if DRYING option is available and selected) may be adversely affected and longer drying times may be needed.

1) **If WATER SAVER is not selected (indicator light off)** and rinse water is to be saved for PRE-WASH of next cycle, press WATER SAVER touchpad to select. **If WATER SAVER is selected (indicator light on)** and rinse water is not to be saved for PRE-WASH of next cycle, press WATER SAVER touch pad to bypass.

NOTE: Unit should be fully drained every night. Always set the WATER SAVER to OFF (indicator light off) before starting last cycle of the day.

- MANIFOLD UTENSIL CART (optional)

1) **If UTENSIL CART is deselected (indicator light off)** and manifold cart is positioned over the sliding inlet assembly, press UTENSIL CART touchpad to select. **If UTENSIL CART is selected (indicator light on)** and no manifold cart is positioned over the sliding inlet assembly, press UTENSIL CART touch pad to bypass.

⚠ WARNING: BURN HAZARD

- **After pressing STOP, wait until water flow stops before opening door. Hot water/steam may be sprayed through door opening if door is opened too soon.**

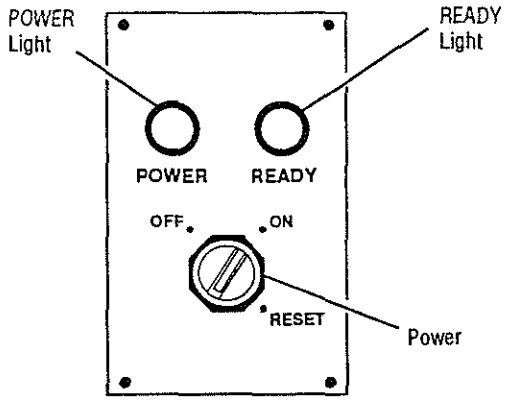


Figure 2-7. Turn Power Switch to ON

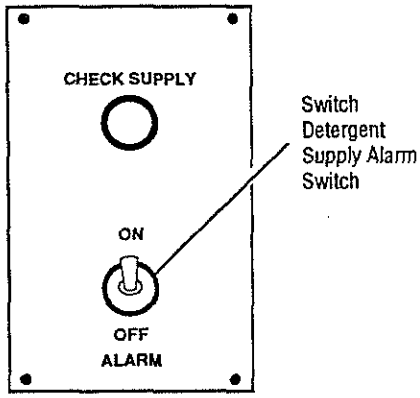


Figure 2-8. Flip Detergent Supply Alarm Switch to ON

NOTE: This selection cannot be made when pump is running. It must be selected at the beginning of the cycle before pressing START, or when machine is filling, or after pressing STOP.

4. Close control panel door.

2.4 OPERATION

⚠ WARNING: FALL HAZARD

- **To prevent falls, keep floors dry. Promptly clean up any spills or drippage.**

1. Open door and load chamber. If optional manifold cart coupling system is installed on unit and manifold utensil cart washing is desired, position manifold cart over sliding inlet assembly.
2. Close door and turn power switch to ON. POWER light glows red (see Figure 2-7). Flip detergent supply alarm switch to ON (see Figure 2-8).

3. Open hinged door covering main control panel. Choose phase settings as described in Section 2.3, then close hinged door.

NOTE: Washer cannot be started until READY light glows green.

4. When READY light glows green (immediately, or if optional water temperature booster is installed, after water in booster tank is heated to 180°F [82°C]), press START. If a double-door unit (optional), IN USE light on back (clean-side) control panel will glow green.

⚠ WARNING: BURN HAZARD

- **After pressing STOP, wait until water flow stops before opening door. Hot water/steam may be sprayed through door opening if door is opened too soon.**

NOTE: Washer operation can be halted at any time by pressing STOP. To resume cycle, press START. If it is necessary to open door after pressing STOP, wait for water flow to stop and then open door. To resume cycle, close door and press START.

5. Cycle proceeds through selected phases as follows:

NOTE: During each cycle phase, the corresponding cycle phase indicator light flashes (see Figure 2-9).

NOTE: If, during the cycle, you want to extend the time of a particular phase, press the EXTEND CYCLE touch pad while the phase is in progress. This suspends the initial time setting and causes the phase in progress to continue until the EXTEND CYCLE touch pad is pressed again. The phase then continues until the initial time setting is expended.

- PRE-WASH—load is pre-washed with water from building supply line (or water from rinse phase if WATER SAVER is ON) for time interval selected (nine minutes maximum).

NOTE: If rinse water was saved from previous cycle (WATER SAVER was set to ON), then there will be no FILL time for PRE-WASH phase.

- WASH—load is washed with 180°F (82°C) water, either from building supply line or from optional water temperature booster tank, for time interval selected (nine minutes maximum). A controlled amount of detergent is injected into water at beginning of phase.
- RINSE—load is washed with 180°F (82°C) water, either from building supply line or from optional water temperature booster tank, for time interval selected (nine minutes maximum). If optional rinse agent injection is installed, a controlled amount of rinse agent is injected into water at beginning of phase.

NOTE: If unit is not equipped with automatic rinse agent injection system, it can be added manually. Press STOP, wait for water flow to stop, open door and pour rinse agent: either 2 oz (60 ml)—Series 120 washers, or 3 oz (90 ml)—Series 220 washers, onto chamber floor. Close door and press START. Washer then proceeds through phase as outlined above.

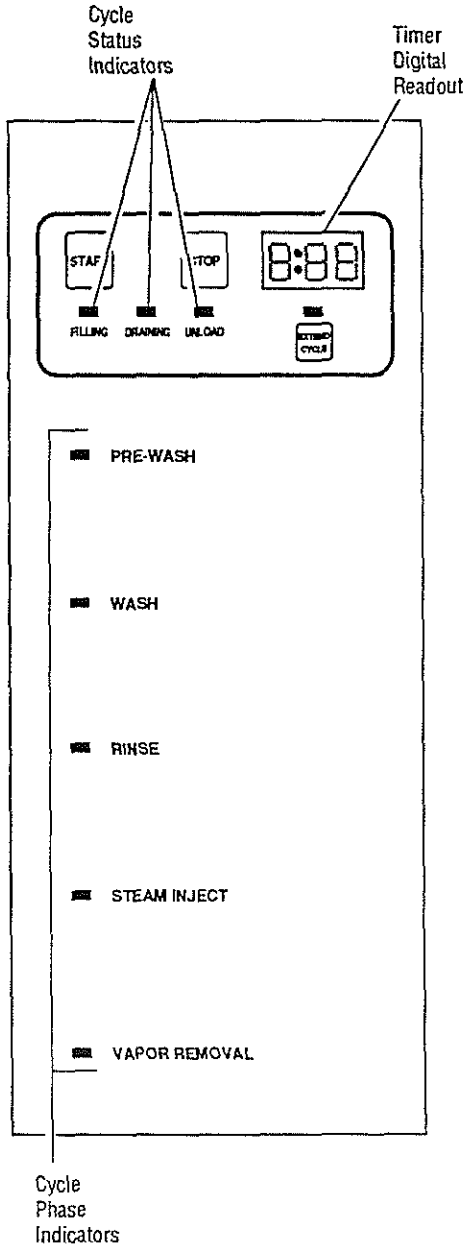


Figure 2-9. Cycle Status

- STEAM INJECTION—if unit is equipped with optional steam injection, steam is admitted into chamber for time interval selected (nine minutes maximum). If optional drying package is not installed, vapor removal system starts and optional vent damper (if installed) opens.
- VAPOR REMOVAL—all visible hot vapors in chamber are exhausted for time interval selected (nine minutes maximum). When phase time expires UNLOAD indicator light glows on main control panel. If a double-door unit, green IN USE light goes off and red UNLOAD light comes on on back (clean-side) control panel.

...or...

- DRYING—if unit is equipped with optional drying package, air from chamber is circulated, at high velocity, through a steam heat exchanger and back to chamber for time interval selected (nine minutes maximum). When phase time expires UNLOAD indicator light glows on main control panel. If a double-door unit, green IN USE light goes off and red UNLOAD light comes on on back (clean-side) control panel.

6. Open door. UNLOAD light on front side (and, if double-door unit, on back side) goes off. Leave door open to permit load to air dry and to cool before removing from chamber.

NOTE: When UNLOAD light is on, door must be opened and then closed before another cycle can be started.

2.5 SHUTDOWN

1. Turn power switch to OFF.
2. Close unit supply valves.
3. Position building electrical supply disconnect switch (circuit breaker) to OFF.
4. Clean unit as described in *Section 4, Inspection and Maintenance.*

Section 3: Principles of Operation

3.1 GENERAL

Reliance 120/220 Hospital Cart Washers are equipped with an automatic control which operates all pre-programmed cycles. Refer to the Figure 3-1 and electrical schematics in Section 6 when reviewing the cycle description below.

3.2 CYCLE DESCRIPTION

When power switch is turned to ON, the POWER indicator light (red) on front (soiled-side) and the interior light come on. Front (clean side) control panel is energized and, **if double-door unit**, START and STOP buttons on back (clean-side) control panel are energized. Detergent and, **if option is installed, rinse agent** pump prime switches are energized. Door switch(es) on front (soiled side) and, **if double-door unit**, back (clean side) are energized.

If unit is not equipped with optional water temperature booster tank, READY light comes on.

If unit is equipped with optional water temperature booster tank, hot water begins to fill tank and steam coils begin to heat. When water in booster tank reaches high level, high level switch closes, energizing the R24 relay, opening the normally closed (N.C.) R24 contact and closing the hot water filling valve. At the same time the normally open (N.O.) R24 contact closes. When thermostat in booster tank senses that water in booster tank has reached 180°F (82°C), R23 is energized, closing the R23 contact. When the N.O. R24 contact and the R23 contact are both closed, the READY light comes on. When the READY light comes on, R21 and R22 are energized, enabling the chamber water level switch, the chamber hot water filling valve and the water temperature booster tank output valve.

When START is pressed, R6 is energized enabling control outputs. **If a double-door unit**, IN USE light on back (clean-side) control panel comes on.

If unit is equipped with either drying option (vented or non-vented), travelling spray manifold and dryer fan motors come on. Traveller and dryer fan motors operate during all phases.

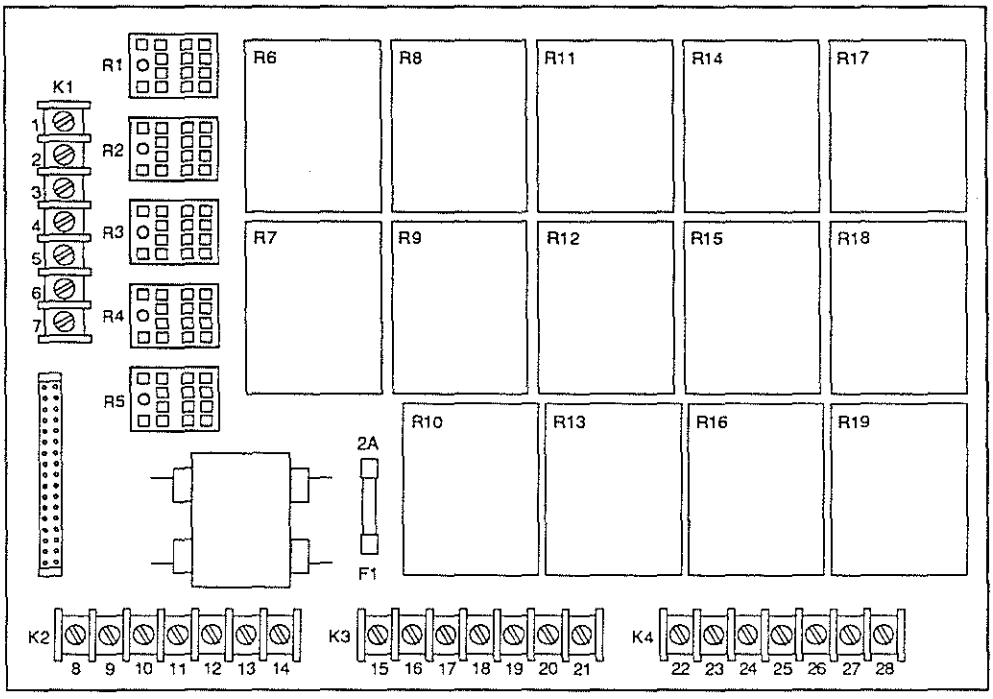


Figure 3-1. Interface (I/O) Board

If unit is equipped with non-vented drying (with condenser), condenser cold water supply valve opens and condenser comes on. Condenser operates during all phases.

Cycle proceeds as follows:

- **PRE-WASH**

PRE-WASH indicator light flashes and FILLING indicator light turns on. R14 (K4-24) energizes and hot water valve opens.

When water in chamber reaches appropriate level, water level switch closes, energizing R5 (K1-6). R14 de-energizes, closing hot water valve, and FILLING indicator light goes off.

NOTE: If water has been saved from previous cycle (WATER SAVER ON) then there will be no filling time.

If unit is not equipped with drying option, R13 energizes, turning on travelling spray manifold. R16 (K4-22) energizes, turning on pump. Timer digital readout starts counting down time set for PRE-WASH phase. When timer digital readout displays "0:00," R16 de-energizes, stopping pump. **If unit is not equipped with drying option,** R13 de-energizes, stopping travelling spray manifold.

After five seconds, DRAINING indicator light comes on. R10 (K3-16) energizes, opening drain valve. Two seconds later R16 (K4-22) energizes, turning pump on. Pump runs for preset time of 35 seconds (Model 120) or 45 seconds (Model 220), then R16 de-energizes (stopping pump) and R10 de-energizes (closing drain valve). DRAINING indicator light goes off and PRE-WASH indicator light stops flashing.

- **WASH**

WASH indicator light flashes and FILLING indicator light turns on.

If unit is not equipped with water temperature booster tank, or if unit is equipped with water temperature booster tank and hot water is selected, R14 (K4-24) energizes, opening hot water valve.

If unit is equipped with water temperature booster tank and very hot water is selected, R11 (K3-21) energizes, opening booster tank very hot water outlet valve.

- If unit is not equipped with non-vented drying option (with condenser), when water level in booster tank lowers, the high level switch opens and R24 relay is de-energized. The R24 N.C. contact closes, opening hot water valve and filling tank. When water in booster tank reaches high level, high level switch closes, energizing R24 relay, opening the R24 N.C. contact and closing hot water valve.
- **If unit is equipped with non-vented drying option (with condenser),** when water level in booster tank lowers, the high level switch opens and R24 relay is de-energized. The R24 N.C. contact closes, energizing R12 relay, which opens filling valve from the condenser to booster tank. When water in booster tank reaches high level, high level switch closes, energizing R24 relay, opening the R24 N.C. contact, de-energizing R12 and closing the filling valve from condenser to booster tank.
- Tank thermostat monitors water temperature in booster tank, turning tank heaters on when temperature drops below 180°F (82°C) and turning them off when 180°F (82°C) is reached. **If unit is equipped with non-vented drying (with condenser),** then tank includes low-level switch. If level in tank falls below low level, switch turns off tank heaters. When water fills tank past low level, heaters turn back on until thermostat senses 180°F (82°C) is reached.

R17 (K4-27) energizes and detergent pump runs for pre-set time (P3 on principal board). When water in chamber reaches appropriate level, water level switch closes, energizing R5 relay (K1-6). Hot or very hot water valve closes and FILLING indicator light goes off.

If unit is not equipped with drying option, R13 energizes, turning on travelling spray manifold. R16 (K4-22) energizes, turning on pump. Timer digital readout starts counting down time set for WASH phase. When timer digital readout displays "0:00," R16 de-energizes, stopping pump. **If unit is not equipped with drying option,** R13 de-energizes, stopping travelling spray manifold.

After five seconds, DRAINING indicator light comes on. R10 (K3-16) energizes, opening drain valve. Two seconds later R16 (K4-22) energizes, turning pump on. Pump runs for preset time of 35 seconds (Model 120) or 45 seconds (Model 220), then R16 de-energizes (stopping pump) and R10 de-energizes (closing drain valve). DRAINING indicator light goes off and WASH indicator light stops flashing.

- **RINSE**

RINSE indicator light flashes and FILLING indicator light turns on.

If unit is not equipped with water temperature booster tank, or if unit is equipped with water temperature booster tank and hot water is selected, R14 (K4-24) energizes, opening hot water valve.

If unit is equipped with water temperature booster tank and very hot water is selected, R11 (K3-21) energizes, opening booster tank very hot water outlet valve.

- **If unit is not equipped with vented drying option (without condenser),** when water level in booster tank lowers, the high level switch opens and R24 relay is de-energized. The R24 N.C. contact closes, opening hot water valve and filling tank. When water in booster tank reaches high level, high level switch closes, energizing R24 relay, opening the R24 N.C. contact and closing hot water valve.
- **If unit is equipped with non-vented drying option (with condenser),** when water level in booster tank lowers, the high level switch opens and R24 relay is de-energized. The R24 N.C. contact closes, energizing R12 relay, which opens filling valve from the condenser to booster tank. When water in booster tank reaches high level, high level switch closes, energizing R24 relay, opening the R24 N.C. contact, de-energizing R12 and closing the filling valve from condenser to booster tank.
- Tank thermostat monitors water temperature in booster tank, turning tank heaters on when temperature drops below 180°F (82°C) and turning them off when 180°F (82°C) is reached. **If unit is equipped with non-vented drying (with condenser),** then tank includes low-level switch. If level in tank falls below low level, switch turns off tank heaters. When water fills tank past low level, heaters turn back on until thermostat senses 180°F (82°C) is reached.

If rinse agent option is installed, R18 (K4-26) energizes and rinse agent pump runs for pre-set time. When water in chamber reaches appropriate level, water level switch closes, energizing R5 relay (K1-6). Hot or very hot water valve closes and FILLING indicator light goes off.

If unit is not equipped with drying option, R13 energizes, turning on travelling spray manifold. R16 (K4-22) energizes, turning on pump. Timer digital readout starts counting down time set for RINSE phase. When timer digital readout displays "0:00," R16 de-energizes, stopping pump. **If unit is not equipped with drying option,** R13 de-energizes, stopping travelling spray manifold.

After five seconds, DRAINING indicator light comes on. R10 (K3-16) energizes, opening drain valve. Two seconds later R16 (K4-22) energizes, turning pump on. Pump runs for preset time of 35 seconds (Model 120) or 45 seconds (Model 220), then R16 de-energizes (stopping pump) and R10 de-energizes (closing drain valve). DRAINING indicator light goes off and RINSE indicator light stops flashing.

NOTE: If WATER SAVER is set to ON, then there will be no draining time. Water remains in chamber for pre-wash phase of next cycle.

- **STEAM INJECTION** (optional)

STEAM INJECTION indicator light flashes.

R12 (K3-20) energizes, opening steam injector valve.

If unit is not equipped with drying option, then R15 (K4-23) energizes. **If option is installed, condenser cold water supply valve opens and condenser starts. If options are installed, automatic vent damper and/or exhaust blower** starts.

If unit is not equipped with drying option, R13 energizes, turning on travelling spray manifold. Timer digital readout starts counting down time set for STEAM INJECTION phase. When timer digital readout displays "0:00," R12 de-energizes, closing steam injector valve. **If unit is not equipped with drying option,** R13 de-energizes, stopping travelling spray manifold.

If unit is not equipped with drying option, condenser, automatic vent damper and/or exhaust blower (if options are installed) remain on for vapor removal phase.

- **VAPOR REMOVAL** (if no drying options are installed)

VAPOR REMOVAL indicator light flashes.

If unit is not equipped with optional steam injection, then R15 (K4-23) energizes. **If option is installed, condenser cold water supply valve opens and condenser starts. If options are installed, automatic vent damper and/or exhaust blower** starts.

If unit is equipped with optional steam injection, then **condenser, automatic vent damper and/or exhaust blower (if options are installed)** continue to run from steam injection phase.

Timer digital readout starts counting down time set for VAPOR REMOVAL phase. When timer digital readout displays "0:00," R15 de-energizes, turning off, condenser, automatic vent damper and/or exhaust blower, if options are installed.

- **DRYING** (optional)

DRYING indicator light flashes.

R15 (K4-23) energizes, opening steam valve to dryer heating coil. Electronic thermostat monitors temperature of air in exhaust duct and closes valve to heating coil when temperature in duct reaches 240°F (115°C).

Timer digital readout starts counting down time set for DRYING phase. When timer digital readout displays "0:00," R15 de-energizes.

- UNLOAD

When entire cycle is complete, UNLOAD indicator light on front (soiled-side) turns on.

R9 (K3-17) energizes. **If optional drying package is installed, travelling spray manifold and dryer fan motors turn off. If optional non-vented drying (with condenser) is installed, condenser cold water valve closes and condenser shuts off. If double-door unit,** UNLOAD indicator light on back (clean-side) control panel comes on and IN USE light goes off.

When door is opened, signal passes to relay R3 (K1-4), turning off UNLOAD indicator light on front (soiled-side) control panel. **If double-door unit,** R9 (K3-17) de-energizes, turning off UNLOAD indicator light on back (clean-side) control panel.

NOTE: A cycle cannot be started if UNLOAD indicator is on. Door must be opened, to turn off UNLOAD indicator, and then closed before starting next cycle.

- CYCLE INTERRUPTION

When STOP is pressed during a cycle all electrical components shut off, stopping washer operation.

If door(s) is opened during a cycle, R3 relay (K1-4) shuts off all electrical components, stopping washer operation.

When START is pressed to resume operation (either on the front or, if double-door unit, back control panel), cycle resumes at phase where interrupted, however phase time resets and entire phase time is run again.

- EXTEND CYCLE

When EXTEND CYCLE touch pad is pressed during any phase, EXTEND CYCLE indicator light goes on and phase continues until EXTEND CYCLE touch pad is pressed again. Then EXTEND CYCLE indicator light goes off and phase time count-down continues, from point where suspended, until initial time setting runs out.

Section 4: Inspection and Maintenance

⚠ WARNING: PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD

- **Regularly scheduled preventive maintenance, in addition to the faithful performance of the minor maintenance described below, is required for safe and reliable operation of this equipment. Contact AMSCO service to schedule preventive maintenance.**

⚠ WARNING: PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD

- **Only fully qualified service personnel should make repairs and adjustments to this equipment. Maintenance done by inexperienced, unqualified personnel or installation of unauthorized parts could cause personal injury, invalidate the warranty, or result in costly damage. Contact your AMSCO sales or service representative regarding service options.**

⚠ WARNING: ELECTRIC SHOCK HAZARD

- **Lock building electrical supply switch to OFF before performing any service on unit.**

Procedures described in this section should be performed at regular intervals as indicated. The interval frequency should be increased with increased usage of the equipment. Should a problem occur, refer to *Section 6, Troubleshooting.*

A Preventive Maintenance Agreement is available to assure peak equipment performance and avoid unscheduled downtime. The agreement includes maintenance adjustments and replacement of worn parts by a qualified technician on a scheduled basis. Contact your AMSCO representative if interested in details.

Maintenance procedures should be performed only by a qualified technician.

4.1 CLEANING PROCEDURES

AMSCO recommends the following cleaning products (see Table 4-1 for ordering information):

- AMSCO ALKALINE DETERGENT—for routine cleaning and polishing of unit interior.
- AMSCRUB—for routine cleaning and polishing of unit exterior.

Table 4-1. Detergent/Cleaning Products

DESCRIPTION	QUANTITY /CASE	REORDER NUMBER
Detergent:		
AMSCO ALKALINE DETERGENT	5 gal	NM826
AMSCO ALKALINE DETERGENT	15 gal	NM827
AMSCO ALKALINE DETERGENT	30 gal	NM828
AMSCO ALKALINE DETERGENT	4 x 1 gal	NM825
AMSCO ALKALINE DETERGENT	6 x 1 liter	NM824
Rinse Agent:		
Dri-Aid	4 x 1 gal	NM600
Cleaning Products:		
Liquid Descaler	4 x 1 gal	NM500
AMSCRUB	12 x 32 oz	NM400
Pry® Stain Remover Cream	12 x 12 oz	NM430

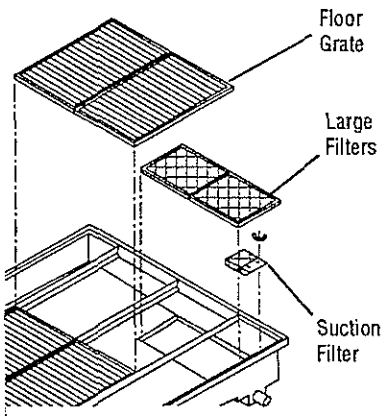


Figure 4-1. Clean Chamber Filters

- Liquid Descaler—for removing scale and other hard water deposits from unit interior and accessories.
- AMSCO Pry® Stain Remover Cream—for stubborn stains.

Also ask for our catalog, *AMP-7287*, which describes other AMSCO cleaning products.

NOTE: Follow manufacturer's recommendations regarding use of these products (i.e., concentration, safety precautions, etc.).

⚠ WARNING: FALL HAZARD

- **To prevent falls, keep floors dry. Promptly clean up any spills or drippage.**

4.1.1 Daily Cleaning

After last cycle of the day, allow machine to cool and then remove and clean large filters in bottom of wash chamber (see Figure 4-1). Clean filters while they are still wet, before foreign matter dries.

4.1.2 Weekly Cleaning

⚠ CAUTION:

- **Use non-abrasive cleaners when cleaning the unit. Follow directions on containers and rub in back-and-forth motion (in same direction as surface grain). Abrasive cleaners will damage stainless steel. Cleaner rubbed in a circular motion or applied with a wire brush or steel wool on door and chamber assemblies can be harmful to stainless steel. Do not use these cleaners on painted surfaces.**

1. Clean washer exterior as follows using AMSCRUB for general stains and Pry Stain Remover Cream to remove stubborn stains:
   a. Using a damp cloth or sponge, apply cleaner in a back-and-forth motion, in same direction as surface grain.
   b. Thoroughly wipe off cleaner.
   c. Polish surface with a clean, dry, lint-free cloth.
2. Clean travelling spray manifold nozzles as follows (see Figure 4-2):

NOTE: Nozzles should be cleaned in place.

   a. Make sure unit is cool.

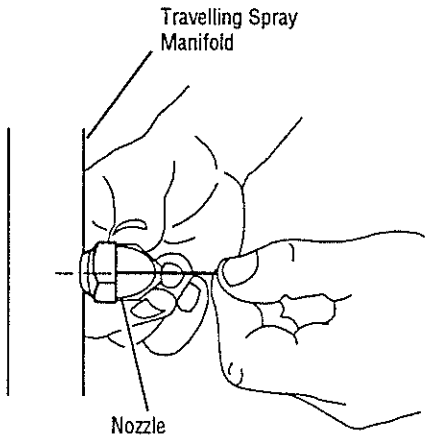


Figure 4-2. Clean Travelling Spray Manifold Nozzles

⚠ WARNING: PERSONAL INJURY/BURN HAZARD

- **Keep chamber door(s) open when performing any maintenance inside chamber. When doors are closed, a cycle can be started at which time hot water would be sprayed into chamber.**

   b. Open door(s) and step into chamber. Do not close door(s) while in chamber.
   c. Remove plugs at bottom of nozzle supply pipes.
   d. Insert a wire (approximately the wire gauge of a large paper clip) into nozzle and push sediment through nozzles into pipes.
   e. Step out of unit and close door(s).
   f. Position power to ON and press START.
   g. Operate unit for approximately 30 seconds to remove sediment from pipes.
   h. Position power to OFF.

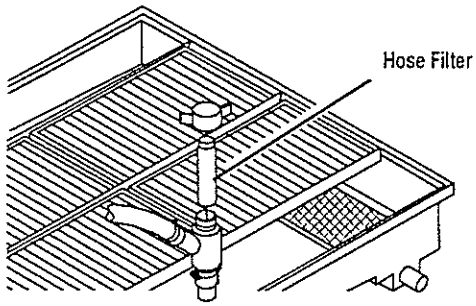


Figure 4-3. Clean Travelling Spray Manifold Hose Filter

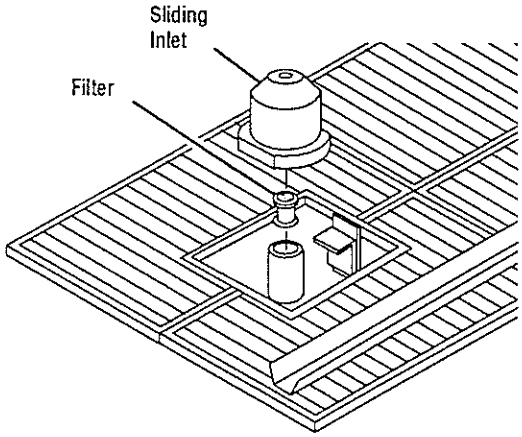


Figure 4-4. Clean Sliding Inlet Filter

i. Allow unit to cool.

j. Open door(s) and step into chamber. Reinstall plugs.

3. Clean travelling spray manifold hose filter (see Figure 4-3).
4. If unit is equipped with optional manifold cart coupling system, clean sliding inlet filter as follows (see Figure 4-4):
   a. Turn sliding inlet and lift it up and out of chamber.
   b. Remove filter from sliding inlet and rinse under running water to clean.
   c. Replace filter in sliding inlet.
   d. Return sliding inlet to chamber and turn to fasten in place.

⚠ WARNING: BURN HAZARD

- **Allow piping to cool down before inspecting and/or cleaning supply-line strainers.**

5. Clean building supply-line strainers as follows:
   a. Close building supply lines: hot water and, if unit is equipped with condenser, steam injection and/or steam hot water temperature booster options, cold water and steam.
   b. Allow piping to cool, then remove and clean strainers.
   c. Replace strainers and open building supply lines.

4.1.3 Monthly Cleaning

NOTE: Depending on hardness of water being used, it may be necessary to remove hard water deposits more often. Remove deposits from chamber and accessories whenever deposits become visible.

Remove hard water deposits from chamber (and manifold carts if unit is equipped with optional manifold cart coupling system).

1. Open chamber door.
2. If unit includes optional manifold cart coupling system, place manifold cart in chamber and position it over sliding inlet assembly.
3. Pour AMSCO Liquid Descaler into chamber—30 oz (887 ml) for model 220 washer; 25 oz (739 ml) for model 120 washer. Close chamber door.
4. Position power switch to ON.
5. Set PRE-WASH phase time to 9 minutes. Bypass all other phases (see Section 2.3).
6. If unit includes optional manifold cart coupling system, press MANIFOLD UTENSIL CART touch pad to select (indicator light ON).
7. Press START. When cycle is complete, open and close door.
8. To completely rinse the system, press START and run a second cycle.
9. At completion of second cycle, open door and allow unit to air dry. If manifold cart was inserted into chamber, remove cart after it has dried.

4.1.4 Quarterly Cleaning

If unit includes optional manifold cart coupling system, clean manifold cart rotary spray arms as follows:

1. Unscrew center socket and remove entire assembly from cart.
2. Unscrew spray arms and flush with running water to rinse out sediment.
3. Reattach spray arms, positioning them so that holes are pointing up, approximately a 15° angle from vertical. Replace spray arm assembly on manifold cart and tighten down center socket.

4.1.5 Yearly Cleaning

If unit includes optional condenser, steam injection (with condenser), or non-vent drying (with condenser), clean condenser unit as follows:

1. Position power switch to OFF and close unit supply valves.
2. Locate condenser unit on top of washer (see Figure 4-5).
3. Unscrew union where cold water piping comes into condenser.

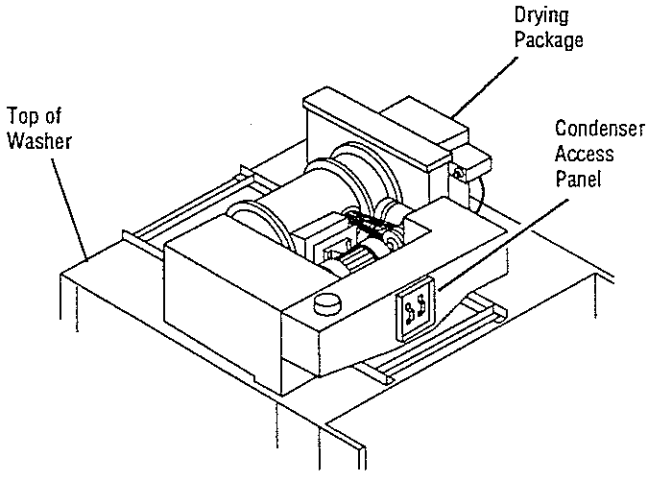


Figure 4-5. Condenser Access Panel

4. Remove screws holding condenser access panel in place. Remove access panel.
5. Remove and clean filter.
6. Remove spray bar assembly from condenser housing. Unscrew spray nozzles.
7. Remove small strainer and metal insert from each spray nozzle. Clean strainers under running water.
8. Insert a wire (approximately the wire gauge of a paper clip) into each nozzle to clean out sediment. Reassemble spray nozzles.
9. Reinstall nozzles on spray bar. Replace spray bar assembly in condenser housing. Replace filter.
10. Replace access panel and fasten in place. Make piping connection.

4.2. MAINTENANCE

4.2.1 Monthly Maintenance

1. Check gear box oil level and inspect and lubricate chain as follows (see Figure 4-6):

NOTE: Do not read oil level gauge while unit is operating.

   a. Make sure power switch is set to OFF.

   b. Check oil level as indicated on glass gauge on side of gear box. It should be between bottom and dot on sightglass. If oil level is below red indicator, fill with SUNOCO SUNEP-1090, MOBIL SPARTAN EP-320 or equivalent.

   c. Inspect chain and lubricate as necessary. Use any pin and chain drive lubricant.

2. Check operation of chain drive friction clutch. Clutch must be kept at 45 lb (200 N) tension. Contact AMSCO Field Service Engineering for verification procedure. If clutch needs adjustment, see Section 7.6.

⚠ CAUTION:

- **Always use a silicone lubricant to lubricate detergent and optional rinse agent squeeze tubes. Petroleum-based lubricants, such as Vaseline or grease, will cause squeeze tubes to melt.**

3. Lubricate and check detergent (and rinse agent, if option is installed) squeeze tubes as follows:

   a. Use **Silicone Lubricant** (P/N 117950-599) to lubricate section of detergent (and rinse agent, if option is installed) squeeze tube in contact with pump.

   b. Check squeeze tube for any leaks or signs of wear. If necessary, replace tubes (see Section 4.2.3).

⚠ WARNING: BURN HAZARD

- **Wear gloves and face protection and open door slowly if it is necessary to open door during a cycle. Hot water may be sprayed through door opening when checking automatic stop while washer is operating.**

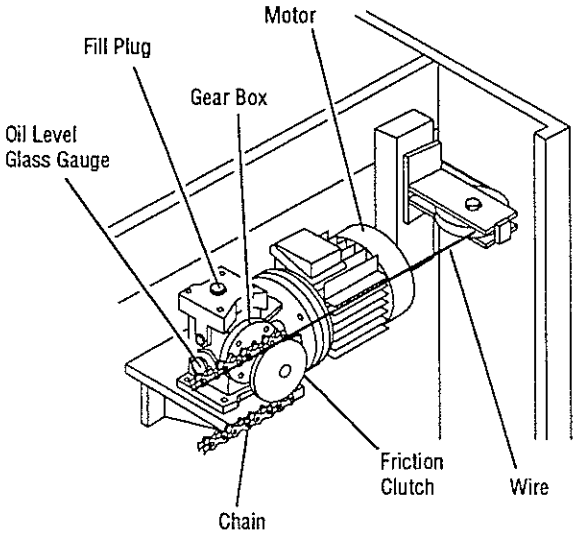


Figure 4-6. Check Gear Box Oil Level

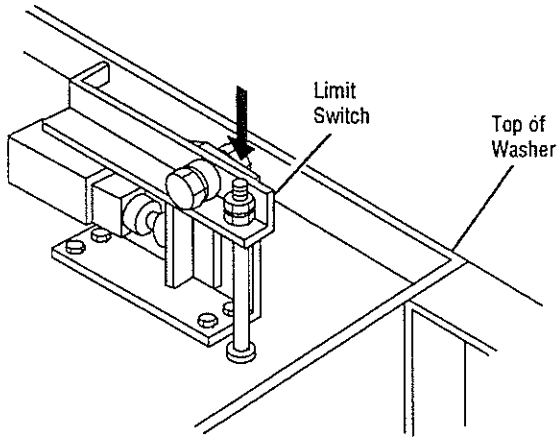


Figure 4-7. Manually Operate Safety Cable Limit Switch

4. Check operation of door safety switch as follows:
   a. Wearing proper safety protection (i.e., gloves and face protection), attempt to initiate a cycle with door(s) open.
   b. Close door(s) and start a cycle. Wearing proper safety protection (i.e., gloves and face protection), slowly open door to check operation of automatic stop.
5. Operate chamber door escape handle to be sure door(s) can be opened from inside the chamber.

⚠ WARNING: PERSONAL INJURY/BURN HAZARD

- **Keep chamber door(s) open when performing any maintenance inside chamber. When doors are closed, a cycle can be started at which time hot water would be sprayed into chamber.**

6. Check safety cable limit switch.
   a. With door open, pull safety cable and verify that switch makes a clicking sound.
   b. Initiate a cycle. Manually actuate safety cable limit switch on top of washer (see Figure 4-7). Verify that washer stops when switch is actuated.

4.2.2 Semi-annually Maintenance

If drying option is installed, lubricate dryer blower bearings as follows (see Figure 4-8):

1. Apply 5 grams (0.35 cu. in.) of SKF LGHT3 grease (approximately three hand grease gun strokes) to each line.
2. Write lubrication date on sticker provided.

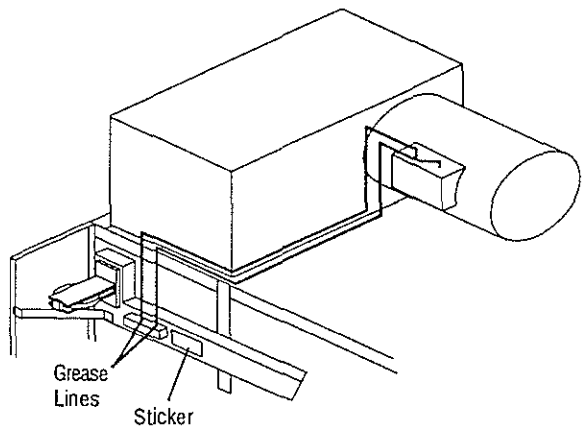


Figure 4-8. Lubricate Dryer Blower Bearings

4.2.3 Yearly Maintenance

⚠ WARNING: CHEMICAL BURN/EYE INJURY HAZARD

- **Wear gloves and eye protection when replacing detergent/rinse agent squeeze tube(s). Residual detergent might remain in used squeeze tubes. If detergent/rinse agent contacts skin or eyes, immediately flush with running water for at least 10 minutes. If contact was with the eyes, seek medical attention.**

Replace detergent (and rinse agent, if option is installed) squeeze tubes as follows (see Figure 4-9):

1. Remove pickup line from detergent (or rinse agent) container.
2. Place a small container under squeeze tube/pickup line connection. Separate squeeze tube from pickup line.
3. Remove clamps and disconnect other end of squeeze tube from chamber feed line.
4. Remove two screws attaching pump cover to pump head. Lift cover away from pump head.
5. Pulling on one end of squeeze tube, pull tube out of pump head. Discard tube.
6. Clean all pump surfaces.

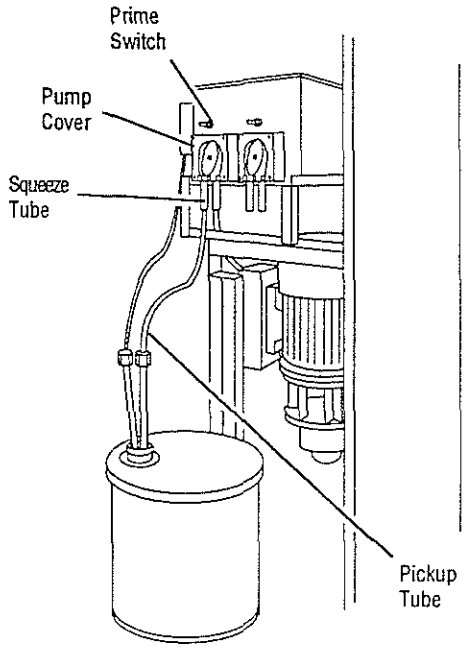


Figure 4-9. Replace Squeeze Tubes

7. Connect new squeeze tube to pickup line.
8. Lubricate new tube with **Silicone Lubricant** (P/N 117950-599). Apply liberally over tube surface to within two inches of ends.
9. Insert end of squeeze tube into pump head. Feed tube through pump head by manually rotating roller block.
10. Liberally spread **Silicone Lubricant** over rollers in roller block.
11. Replace pump cover and fasten with screws removed previously.
12. Connect squeeze tube to chamber feed line and attach clamps.
13. Operate prime switch to fill tubing with detergent (or rinse agent).

4.3 PREVENTIVE MAINTENANCE GUIDE

EQUIPMENT: **Reliance™ 120/220 Hospital Cart Washer**

This form is to be used as a preventive maintenance record and, along with *Section 4* instructions, as a guide to performing preventive maintenance.

(Circle "X" in column when service is performed.)

Table 4-2. Preventive Maintenance Guide

SERVICE PERFORMED:	1	2	3	4	5	6
1.0 PREPARATION FOR PREVENTIVE MAINTENANCE						
1.1 Discuss equipment operation with department personnel.	X	X	X	X	X	X
1.2 Install test equipment.	X	X	X	X	X	X
2.0 CONTROL						
2.1 Gain access to controls.	X	X	X	X	X	X
2.2 Clean lint and dirt from components.	X	X	X	X	X	X
2.3 Inspect all terminals, wiring and connections.	X	X	X	X	X	X
2.4 Inspect and replace any burned out indicator light bulbs.	X	X	X	X	X	X
2.5 Verify operation of all touch pads, switches and buttons.	X	X	X	X	X	X
3.0 DOOR ASSEMBLY						
3.1 Inspect door(s) for ease of operation.		X		X		X
3.2 Lubricate door hinges.	X	X	X	X	X	X
3.3 Check condition and operation of door safety switch(es).	X	X	X	X	X	X
3.4 Check operation of chamber door escape handle.	X	X	X	X	X	X
3.5 Inspect window(s) and window gasket(s); replace as necessary.	X	X	X	X	X	X
4.0 CHAMBER AND TANK COMPONENTS						
4.1 Check that travelling spray manifold moves freely.	X	X	X	X	X	X
4.2 Inspect travelling spray manifold pulleys and cable; replace as necessary.	X	X	X	X	X	X
4.3 Check travelling spray manifold friction clutch.	X	X	X	X	X	X
4.4 Check travelling spray manifold gear box oil level gauge.	X	X	X	X	X	X
4.5 Check travelling spray manifold hose filter; clean as necessary.	X	X	X	X	X	X
4.6 If manifold cart option is installed, check sliding inlet filter; clean as necessary.	X	X	X	X	X	X
4.7 Remove hard water deposits from chamber interior.	X	X	X	X	X	X
4.8 Inspect and clean water level switch. Verify proper operation; replace as necessary.	X	X	X	X	X	X
4.9 Check operation of safety cable limit switch.	X	X	X	X	X	X
4.10 Check chamber filters; clean as necessary.	X	X	X	X	X	X
4.11 Check piping system for leaks; repair if necessary.	X	X	X	X	X	X
4.12 Check that interior light works; replace bulb as necessary.	X	X	X	X	X	X
5.0 SUPPLY-LINE STRAINERS						
5.1 Inspect strainers for debris; clean as necessary.	X	X	X	X	X	X

4.3 PREVENTIVE MAINTENANCE GUIDE (continued)

EQUIPMENT: **Reliance™ 120/220 Hospital Cart Washer**

This form is to be used as a preventive maintenance record and, along with *Section 4* instructions, as a guide to performing preventive maintenance.

(Circle "X" in column when service is performed.)

Table 4-2. Preventive Maintenance Guide (continued)

SERVICE PERFORMED:	1	2	3	4	5	6
6.0 DRAIN VALVE						
6.1 Inspect for leakage and proper operation.	X		X		X	
7.0 STEAM TRAP						
7.1 Inspect steam trap for proper operation.	X	X	X	X	X	X
7.2 Rebuild steam trap.	X					
8.0 EACH SOLENOID VALVE						
8.1 Inspect valve for proper operation.	X	X	X	X	X	X
8.2 Rebuild solenoid valve.		X				
9.0 EACH VACUUM BREAKER						
9.1 Rebuild vacuum breaker.					X	
10.0 EACH GATE/ANGLE/GLOBE VALVE						
10.1 Inspect valve for proper operation.	X	X	X	X	X	X
10.2 Rebuild valve.			X			X
11.0 EACH CHECK VALVE						
11.1 Inspect check valve for proper operation; replace as necessary.	X	X	X			
12.0 DETERGENT (AND RINSE AGENT, IF OPTION IS INSTALLED) INJECTOR						
12.1 Inspect and lubricate squeeze tube; replace as necessary.	X	X	X	X	X	X
12.2 Check amount of detergent (rinse agent) being injected; adjust as necessary.		X		X		X
13.0 PUMP MOTOR						
13.1 Inspect pump seals for leakage; replace as necessary.	X	X	X	X	X	X
13.2 Using amprobe, check electrical current.	X		X		X	
13.3 Check for proper pump rotation.	X	X	X	X	X	X
13.4 While pump is turning, check for free movement (no drag).	X	X	X	X	X	X
13.5 Check for noise and vibration.	X	X	X	X	X	X
14.0 WATER TEMPERATURE BOOSTER TANK (IF OPTION IS INSTALLED)						
14.1 Inspect and clean water level switch(es). Verify proper operation; replace as necessary.	X	X	X	X	X	X
14.2 Clean any scale buildup on steam coils.	X	X	X	X	X	X

4.3 PREVENTIVE MAINTENANCE GUIDE (continued)

EQUIPMENT: Reliance™ 120/220 Hospital Cart Washer

This form is to be used as a preventive maintenance record and, along with *Section 4* instructions, as a guide to performing preventive maintenance.

(Circle "X" in column when service is performed.)

Table 4-2. Preventive Maintenance Guide (continued)

SERVICE PERFORMED:	1	2	3	4	5	6
14.0 WATER TEMPERATURE BOOSTER TANK (CONTINUED)						
14.3 Check operation of thermostat. Verify water temperature; should be 180°F (82°C). Adjust as necessary.	X	X	X	X	X	X
15.0 DRYER (IF OPTION IS INSTALLED)						
15.1 Lubricate dryer blower bearings.	X					
15.2 Check rotation of dryer blower motor.			X			X
16.0 VAPOR REMOVAL SYSTEM						
16.1 Verify proper operation of vapor removal motor; lubricate or replace as necessary.	X	X	X	X	X	X
16.2 Check rotation of vapor removal motor.			X			X
17.0 FINAL TEST						
17.1 Clean lint and dirt from components.	X	X	X	X	X	X
17.2 Inspect all wiring and terminal connections for damage or fraying.	X	X	X	X	X	X
17.3 Run unit through complete cycle to verify proper operation.	X	X	X	X	X	X
17.4 During test cycle, check panel joints for leakage; seal all joints with proper sealant as required.	X	X	X	X	X	X
17.5 During test cycle, check wash and rinse temperatures, should be 180°F (82°C); adjust as necessary.	X	X	X	X	X	X
17.6 If drying option is installed, check temperature of air in exhaust duct, should be 240°F (115°C); adjust as necessary.	X	X	X	X	X	X
17.7 Remove all test equipment installed for this inspection.	X	X	X	X	X	X
17.8 Reinstall any panel or cover that was removed during the inspection.	X	X	X	X	X	X
17.9 Check work area to ensure removal of all materials used during inspection.	X	X	X	X	X	X

Section 5: Field Test Procedure

5.1 GENERAL

WARNING: PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD

- **Only fully qualified service personnel should make repairs and adjustments to this equipment. Maintenance done by inexperienced, unqualified personnel or installation of unauthorized parts could cause personal injury, invalidate the warranty, or result in costly damage. Contact your AMSCO sales or service representative regarding service options.**

Every unit must be tested and inspected according to this procedure whenever a part is adjusted, repaired or replaced. Items which do not comply to test procedures must be corrected and retested.

Keep records of all readings, measurements, discrepancies, corrections, retests and reinspections. Each test must meet the standards of material and performance set forth in this procedure. Refer to *Section 7, Component Repair, Replacement and Adjustment,* should mechanical problems arise or adjustments be required.

5.2 TEST INSTRUMENTATION REQUIRED

- Stopwatch—to check cycle phase timing.
- Calibrated test gauge—must read from 0 to 100 psig (0 to 7 kg/cm²).
- Potentiometer with thermocouple extension—to measure voltage, amperage and water temperature. Place thermocouple inside chamber.

5.3 PRELIMINARY CHECKS

1. Verify proper hookup to required services, i.e., hot water, steam, electric and, if optional condenser or non-vented drying is installed, cold water.

NOTE: Water and steam supply lines should be one pipe size larger than the nominal washer pipe size.

2. Inspect chamber door and door handle for smooth operation. Check that door handle is securely fastened to door.
3. Locate drain valve and, if optional manifold cart coupling system is installed, manifold cart diverter valve on service side of washer (see Figure 5-1).

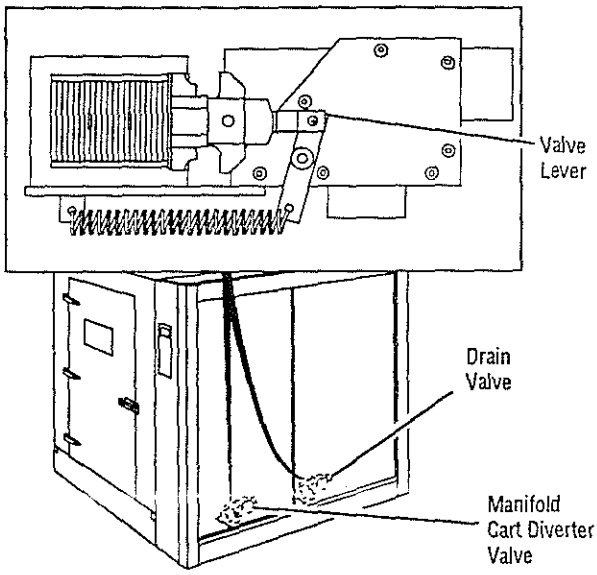


Figure 5-1. Check Operation of Valves

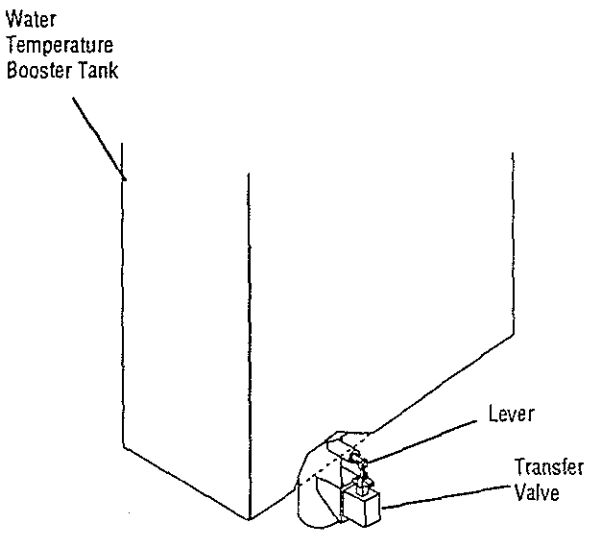


Figure 5-2. Check Transfer Valve on Water Temperature Booster Tank

Manually operate valve lever to ensure proper operation. Verify gaskets are not sticking to seat (lever operation difficult).

4. If optional water temperature booster tank is installed, check transfer valve located under booster tank on service side of washer (see Figure 5-2). Manually operate valve lever and verify that gasket is not sticking to seat (lever operation difficult).

5. Check glass gauge on side of travelling spray manifold gear box to ensure that oil level is correct (see Figure 5-3). It should be between bottom and dot on sightglass.

NOTE: Do not take gauge reading while unit is operating.

6. Check that travelling spray manifold wire is on pulleys.

⚠ WARNING: PERSONAL INJURY/BURN HAZARD

- **Keep chamber door(s) open when performing any maintenance inside chamber. When doors are closed, a cycle can be started at which time hot water would be sprayed into chamber.**

7. Before turning power ON, check safety cable limit switch. With the door open, pull safety cable and verify that switch makes a clicking sound.
8. Inspect pipes, valves, fittings and fasteners for completeness of assembly.
9. Check control wiring and connections.

5.4 CYCLE TEST

⚠ WARNING: FALL HAZARD

- **To prevent falls, keep floors dry. Promptly clean up any spills or drippage.**

- SETUP

1. Position building electrical supply disconnect switch (circuit breaker) to ON.
2. Open hot water, steam and, if unit is equipped with optional condenser or non-vented drying (with condenser), cold water valves.

   Record static and dynamic pressure of each supply at appropriate times during cycle testing. The dynamic pressure for hot water should be 35 to 50 psig (2.46 to 3.52 kg/cm²); for steam and for cold water (if optional condenser is installed) dynamic pressure should be 50 to 60 psig (3.52 to 4.22 kg/cm²).
3. Position power switch to ON. Check that POWER indicator light comes on and that the standard pre-programmed cycle phases (shown in Table 5-1) are displayed on the control panel (Figure 5-4).
4. Check that detergent (and rinse agent, if option is installed) pump prime switch is energized.
5. Attempt to start a cycle before READY light comes on (press START). Verify that cycle can't be started until READY light comes on.
6. If unit is equipped with optional manifold utensil cart system, open door and move manifold cart into chamber. Close door.

NOTE: Do not select UTENSIL CART on the control panel at this time.

7. If optional water temperature booster tank is installed, check that tank begins to fill as soon as power switch is set to ON.
8. Set detergent supply alarm switch to ON (see Figure 5-5).

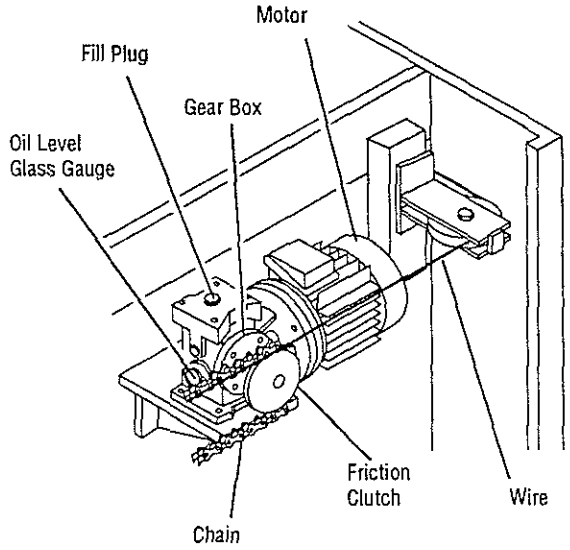


Figure 5-3. Check Gear Box Oil Level

Table 5-1. Standard Pre-programmed (Default) Cycle Phase Settings

PHASE	SELECT PHASE	WATER TEMP w/Booster Tank**	WATER TEMP w/o Booster Tank	PHASE TIME (min)
PRE-WASH	Selected	HOT	HOT	1
WASH	Selected	VERY HOT	HOT*	3
RINSE	Selected	VERY HOT	HOT*	2
STEAM INJ.**	Selected	N/A	N/A	3
VAPOR REM. or DRYING**	Selected Selected	N/A N/A	N/A N/A	4 8
WATER SAVER	Off	N/A	N/A	N/A
MANIFOLD CART**	Off	N/A	N/A	N/A

** If optional water temperature booster is not installed, then this setting provides very hot building-supply water—180°F (82°C).*

*** Optional*

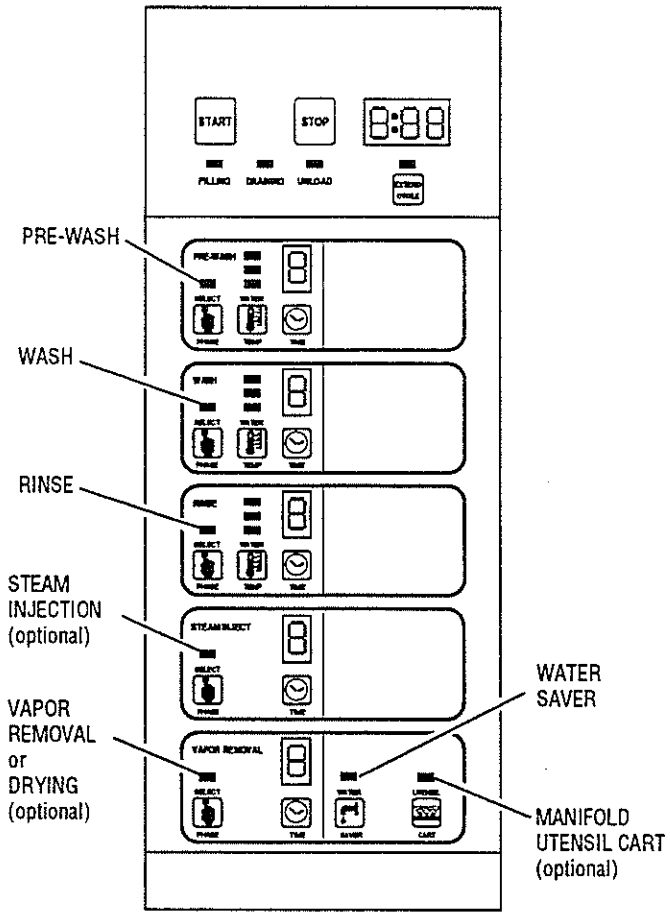


Figure 5-4. Set Cycle Phases

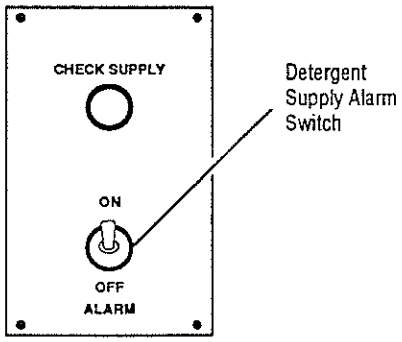


Figure 5-5. Flip Detergent Supply Alarm Switch to ON

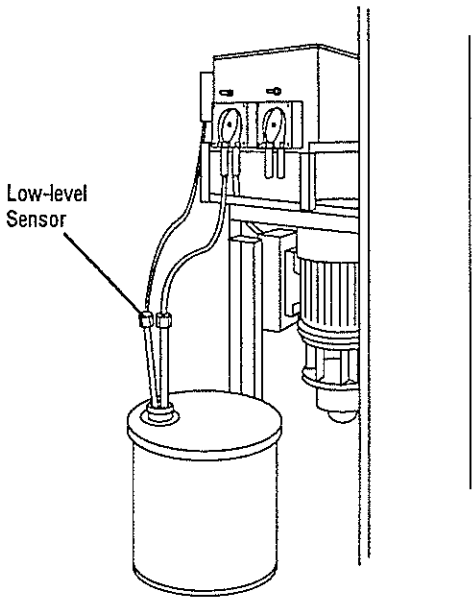


Figure 5-6. Lift Sensor out of Container

- START

1. When READY light glows green, press START.
2. If double-door unit, verify that IN USE on back (clean side) comes on.
3. If unit is equipped with either drying option (vented or non-vented), check that travelling spray manifold and dryer fan motors come on.
4. If unit is equipped with non-vented drying, check that condenser comes on.

- PRE-WASH

1. Verify that PRE-WASH indicator light flashes during pre-wash phase.
2. Check that FILLING indicator comes on and chamber begins to fill with hot water from building supply.
3. Verify that FILLING indicator goes off when sufficient water (water level at 3" over chamber filters) is in chamber (25 ±1 gal [94.6 ±3.8 liters] for model 120; 30 +2/-0 gal [113.5 +7.6/-0 liters] for model 220).
4. Check that pump starts, that phase time appears on timer digital readout and timer begins counting down.
5. If unit is equipped with optional manifold cart system, observe cart through window and verify that no water is being supplied to cart when UTENSIL CART is bypassed on the control.
6. If unit is not equipped with drying option, check that travelling spray manifold starts moving.
7. Observe travelling spray manifold through window and check that it is moving smoothly back and forth and that nozzles are not clogged.
8. Check travelling spray manifold drive rotation. Gear box sprocket should turn clockwise. Check that pulleys operate smoothly, without obstruction. Verify that friction clutch does not slip during cycle.

9. Check pump rotation. Pump should turn counter-clockwise (looking from top).
10. Lift detergent low-level sensor out of container (see Figure 5-6). Verify that CHECK SUPPLY light on front control panel comes on. Replace sensor in container.
11. Verify that pump stops when timer digital readout displays "0:00."
12. If unit is not equipped with drying option, check that travelling spray manifold stops.
13. Verify that drain valve opens and DRAINING indicator comes on after a 5 ±1 second delay.
14. Verify that pump starts after a 2 ±1 second delay. Check that pump runs for either 35 +10/-0 seconds (Model 120), or 45 +10/-0 seconds (Model 220).
15. When draining is complete, verify that pump stops, drain valve closes and DRAINING indicator light goes off. Check that PRE-WASH indicator light stops flashing.

- WASH

1. Verify that WASH indicator light flashes during wash phase.
2. Check that FILLING indicator comes on and chamber begins to fill with hot water from building supply or, if optional water temperature booster tank is installed, with 180°F (82°C) water from booster tank.
3. Verify that detergent is injected into chamber at the injection rate of 1 oz/second—approximately 12.5 oz (370 ml) for Model 120; 15 oz (444 ml) for Model 220.
4. Verify that FILLING indicator goes off when sufficient water is in chamber.
5. Verify that water temperature in chamber is 180°F (82°C).
6. Check that pump starts, that phase time appears on timer digital readout and timer begins counting down.
7. If unit is not equipped with drying option, check that travelling spray manifold starts moving.

⚠ WARNING: BURN HAZARD

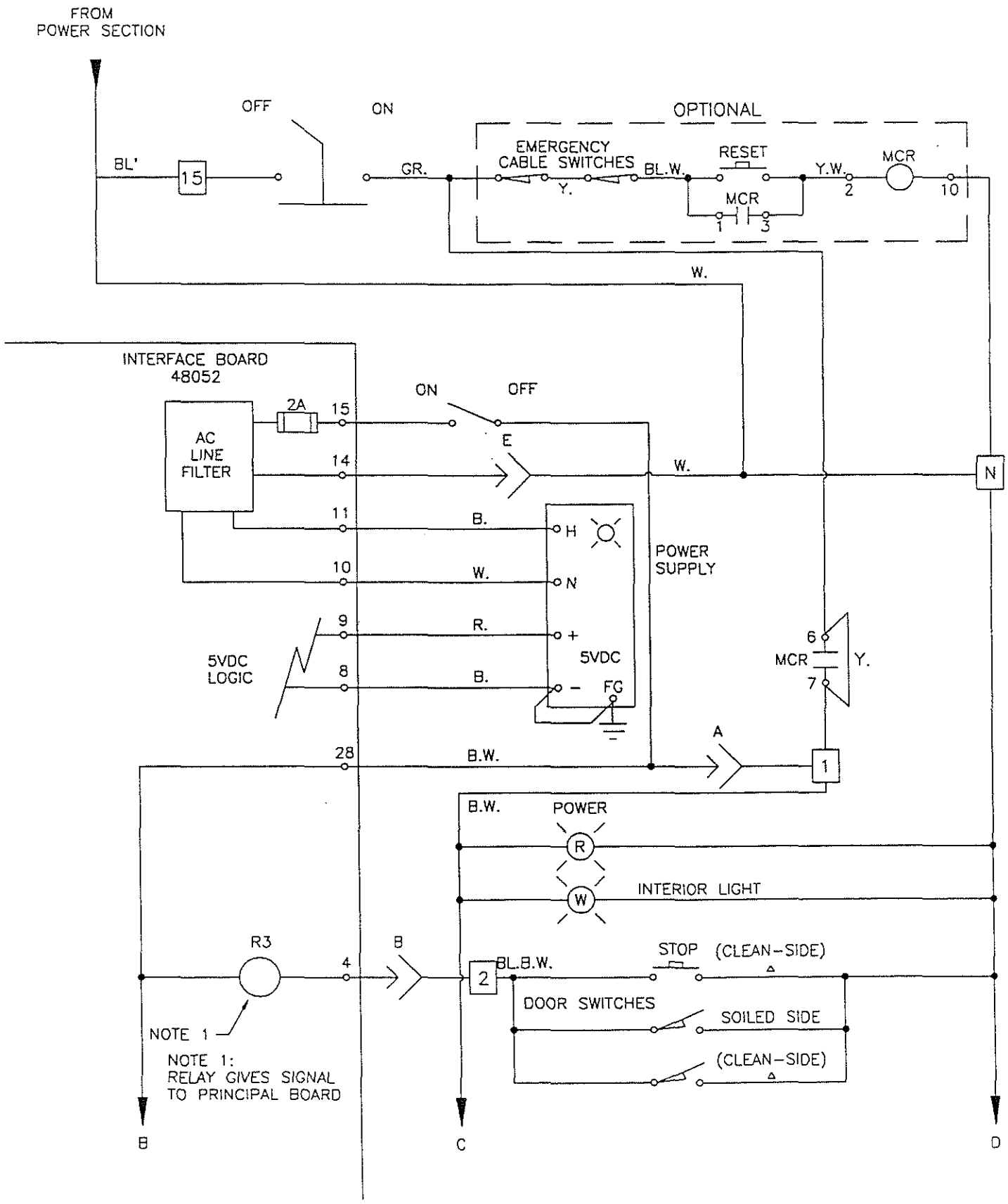
- **After pressing STOP, wait until water flow stops before opening door. Hot water/steam may be sprayed through door opening if door is opened too soon.**

8. Press STOP. Verify that all electrical components shut off, stopping washer operation.
9. If unit is equipped with optional manifold utensil cart system, select UTENSIL CART on the control panel.
10. Press START. Verify that cycle continues with WASH phase and that timer digital readout restarts countdown from original setting.
11. If unit is equipped with optional manifold cart system, observe cart through window and check that water is being sprayed through manifold cart spray arms.
12. If double-door unit, press STOP on back (clean side). Verify that all electrical components shut off, stopping washer operation. Press START. Verify that cycle continues with WASH phase and that timer digital readout restarts countdown from original setting.

⚠ WARNING: BURN HAZARD

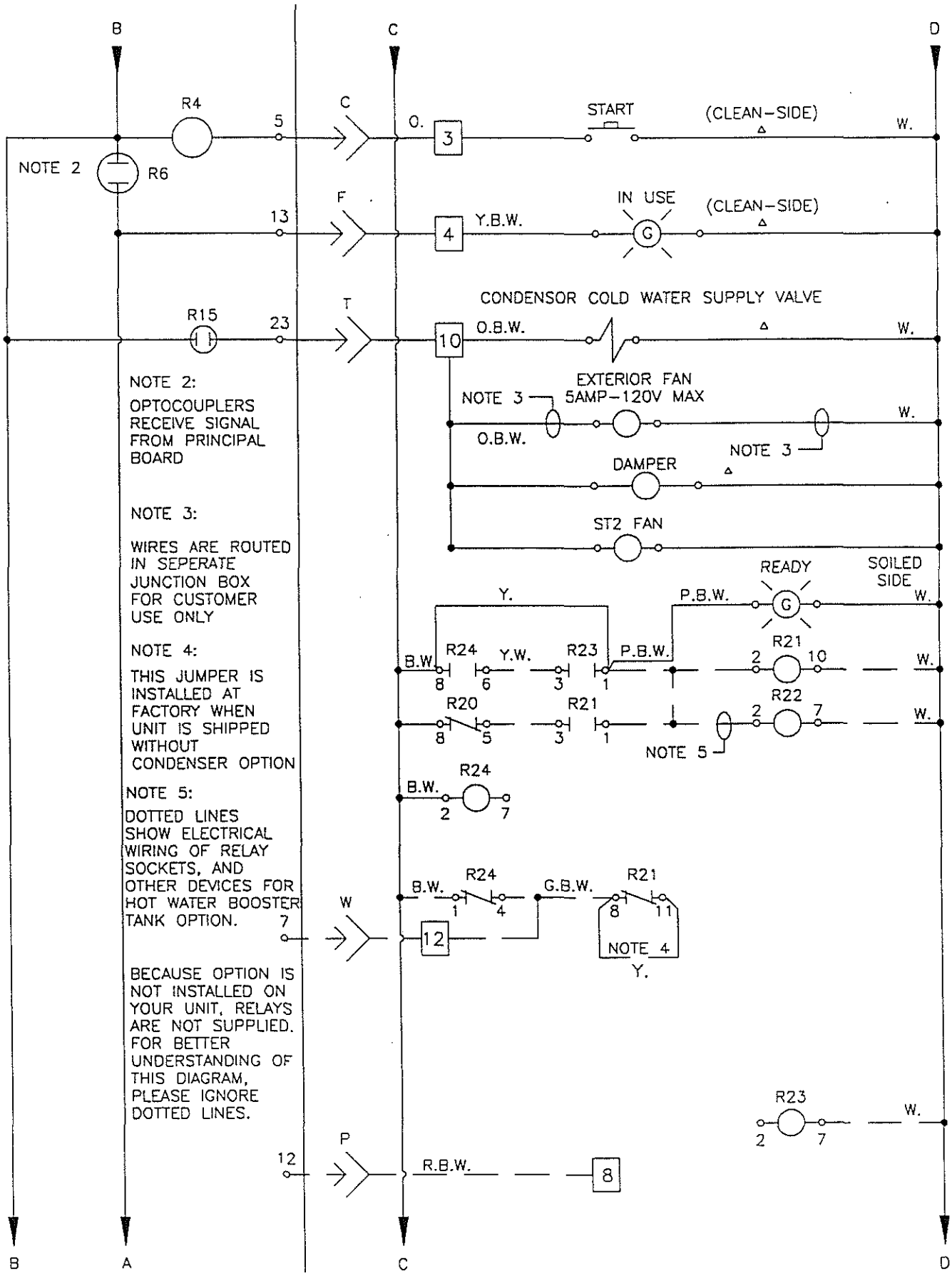
- **Wear gloves and face protection and open door slowly if it is necessary to open door during a cycle. Hot water may be sprayed through door opening when checking automatic stop while washer is operating.**

13. Open front (soiled side) door. Verify that all electrical components shut off, stopping washer operation.
14. Close door and press START. Verify that cycle continues with WASH phase and that timer digital readout restarts countdown from original setting.
15. If a double door unit, open back (clean side) door. Verify that all electrical components shut off, stopping washer operation. Close door and press START. Verify that cycle continues with WASH phase and that timer digital readout restarts countdown from original setting.
16. If optional water temperature booster tank is installed, verify that tank refills after dispensing water to wash chamber. If optional non-vented drying package (with condenser) is installed, verify that tank refills with cold water from the condenser. Verify that tank heaters turn on to heat water.
17. Verify that pump stops when timer digital readout displays "0:00."
18. If unit is not equipped with drying option, check that travelling spray manifold stops.
19. Verify that drain valve opens and DRAINING indicator comes on after a 5 ±1 second delay.
20. Verify that pump starts after a 2 ±1 second delay. Check that pump runs for either 35 +10/-0 seconds (Model 120), or 45 +10/-0 seconds (Model 220).



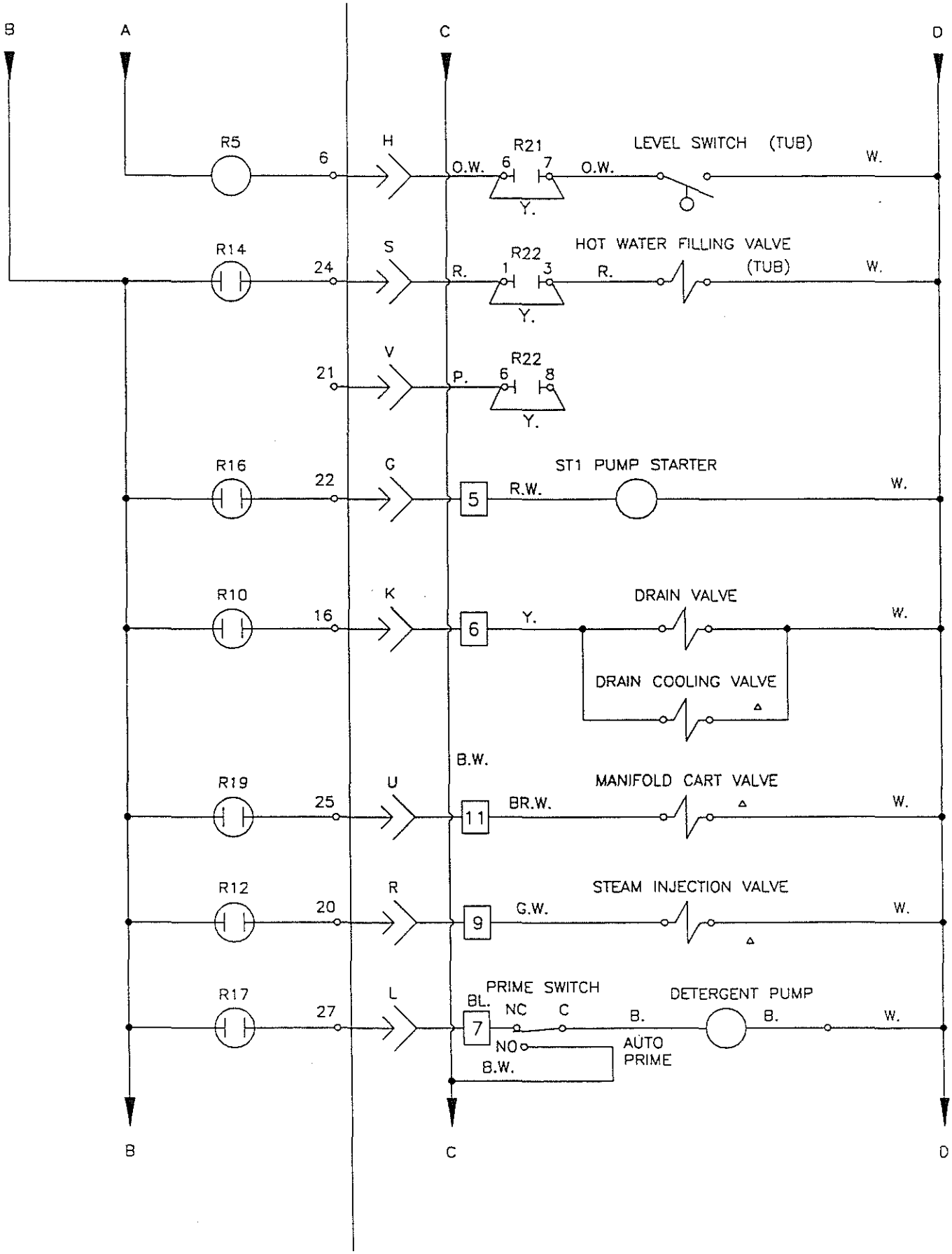
Electrical System Schematic
Without Water Temperature Booster Tank,
With or Without Condenser,
Without Drying Option

P-122990-570 - Part 1 of 4

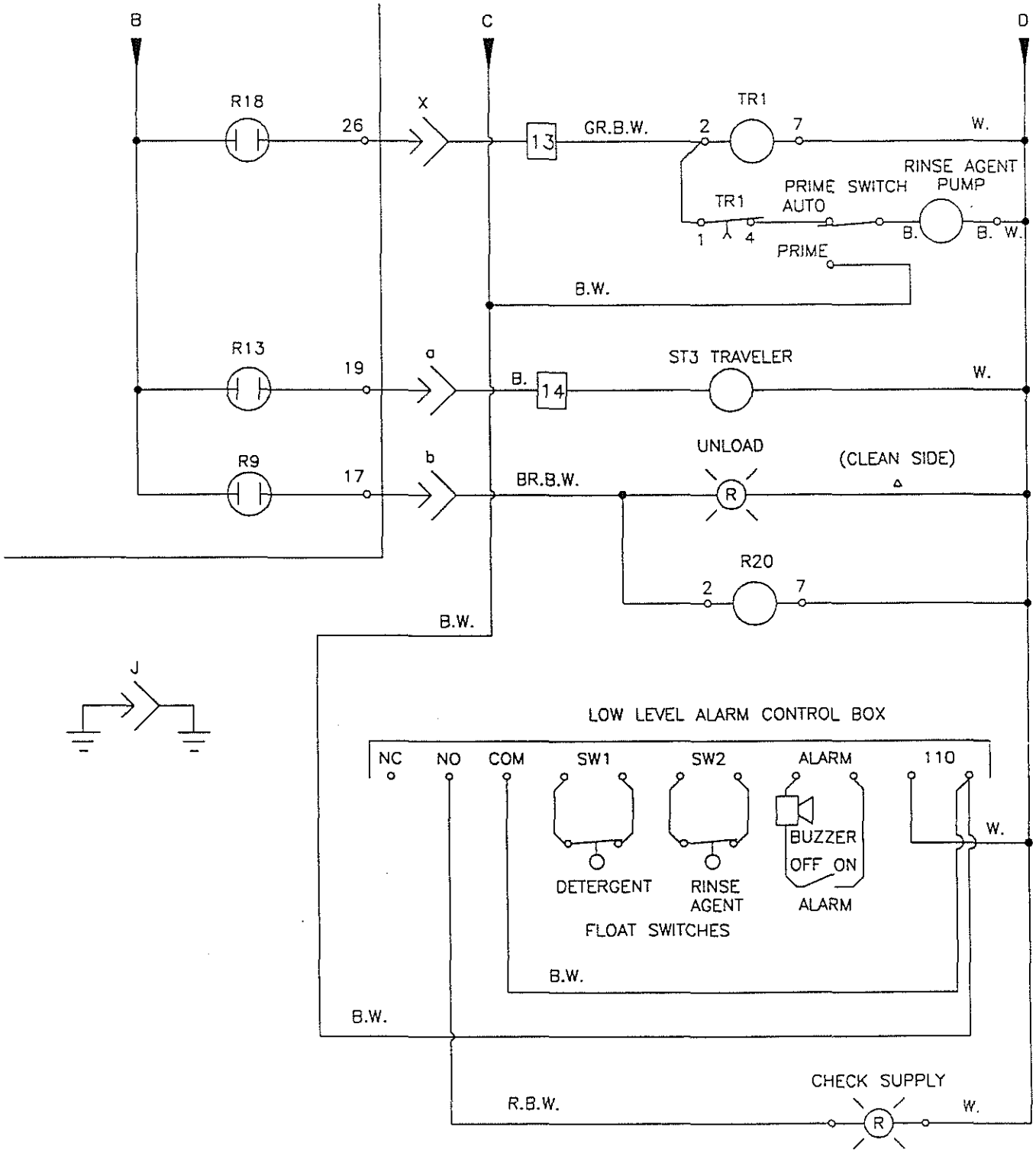


Electrical System Schematic
Without Water Temperature Booster Tank,
With or Without Condenser,
Without Drying Option

P-122990-570 - Part 2 of 4



Electrical System Schematic
Without Water Temperature Booster Tank,
With or Without Condenser,
Without Drying Option
P-122990-570 - Part 3 of 4

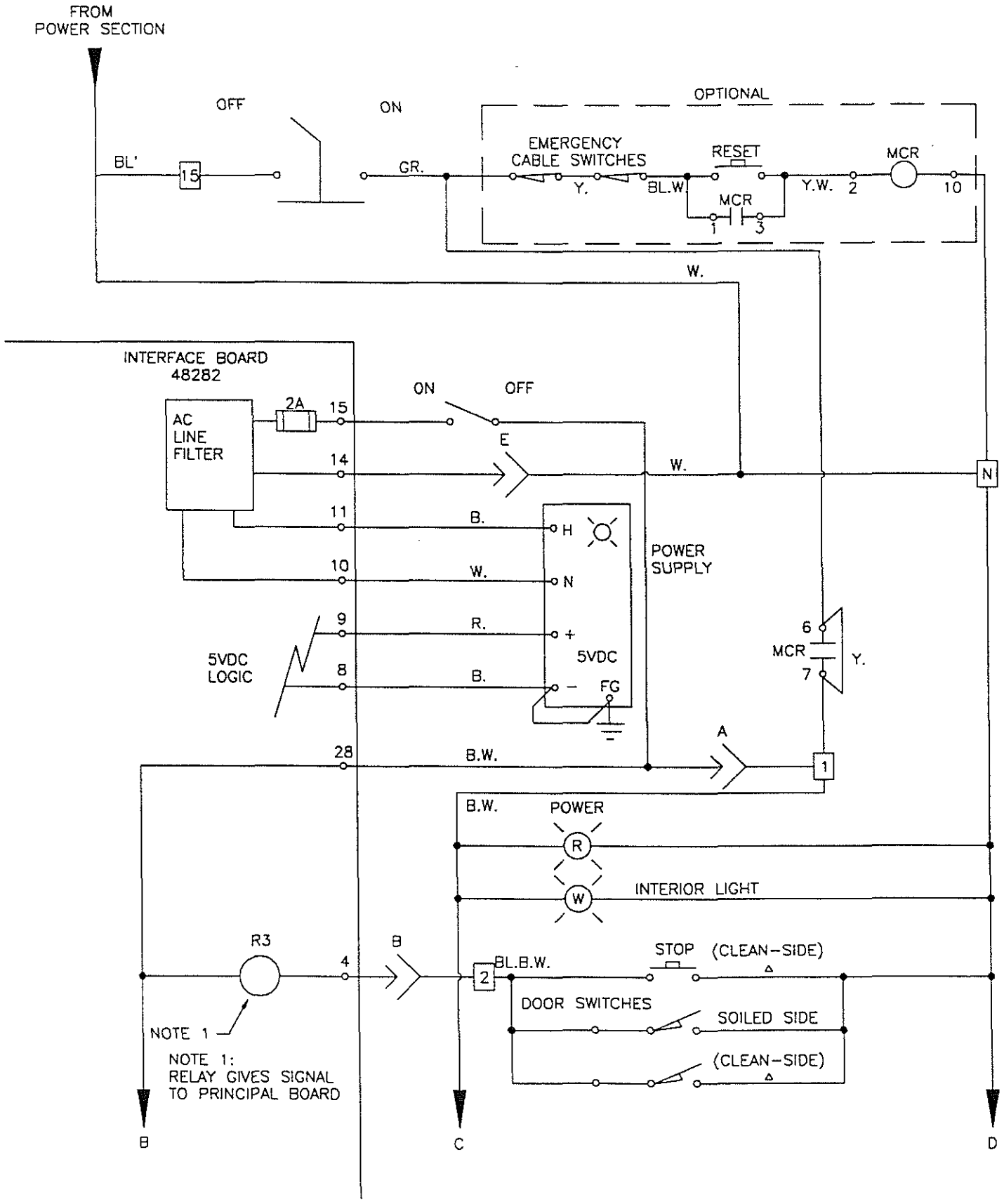


△ : IF OPTION APPLIES

NOTE : SOME VARISTORS MAY BE CONNECTED IN PARALLEL WITH RELAY COILS OR SOLENOID VALVES NOT SHOWN ON DRAWING

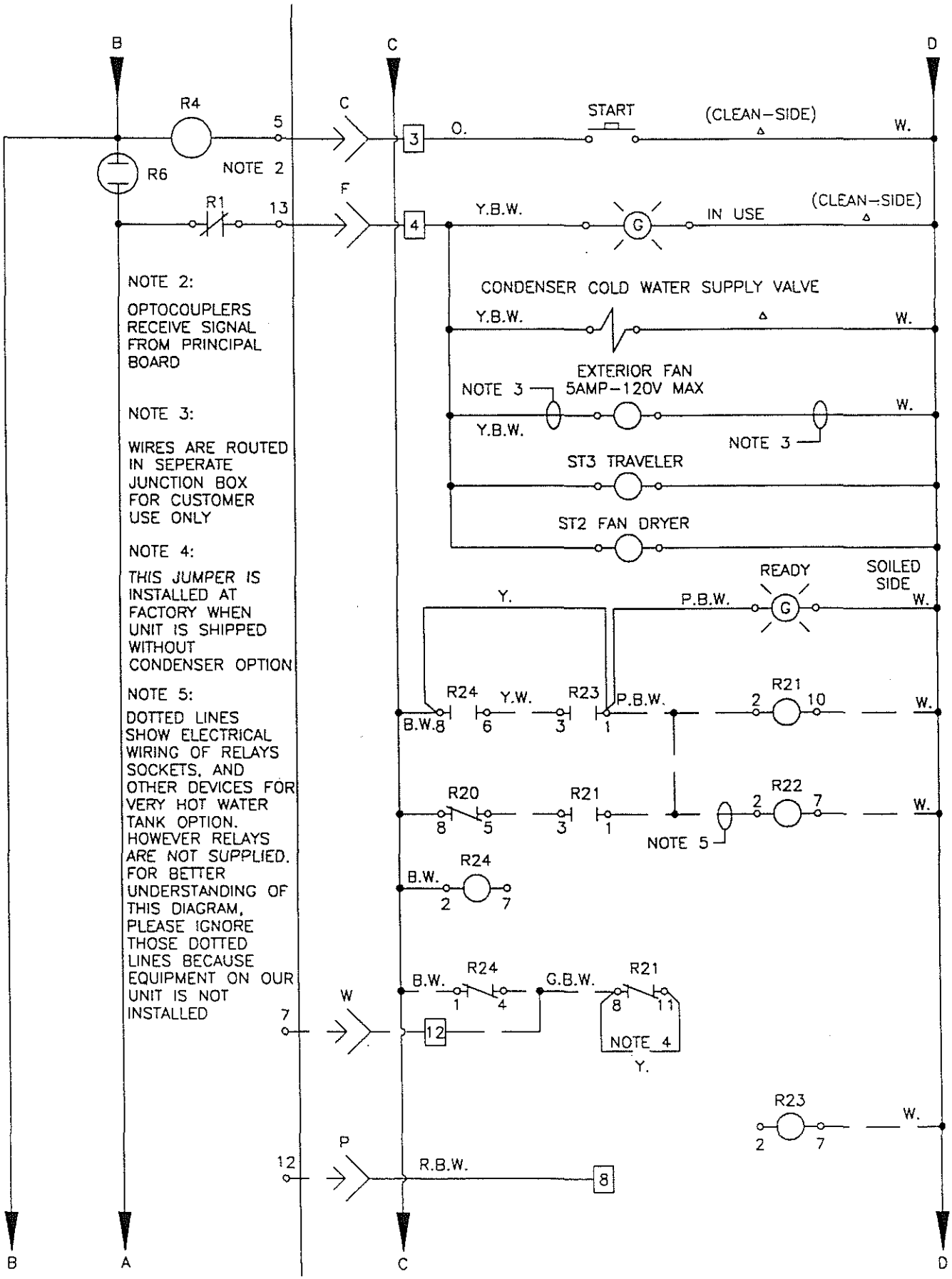
□ –TERMINALS IN RELAY BOX

Electrical System Schematic
Without Water Temperature Booster Tank,
With or Without Condenser,
Without Drying Option
P-122990-570 - Part 4 of 4



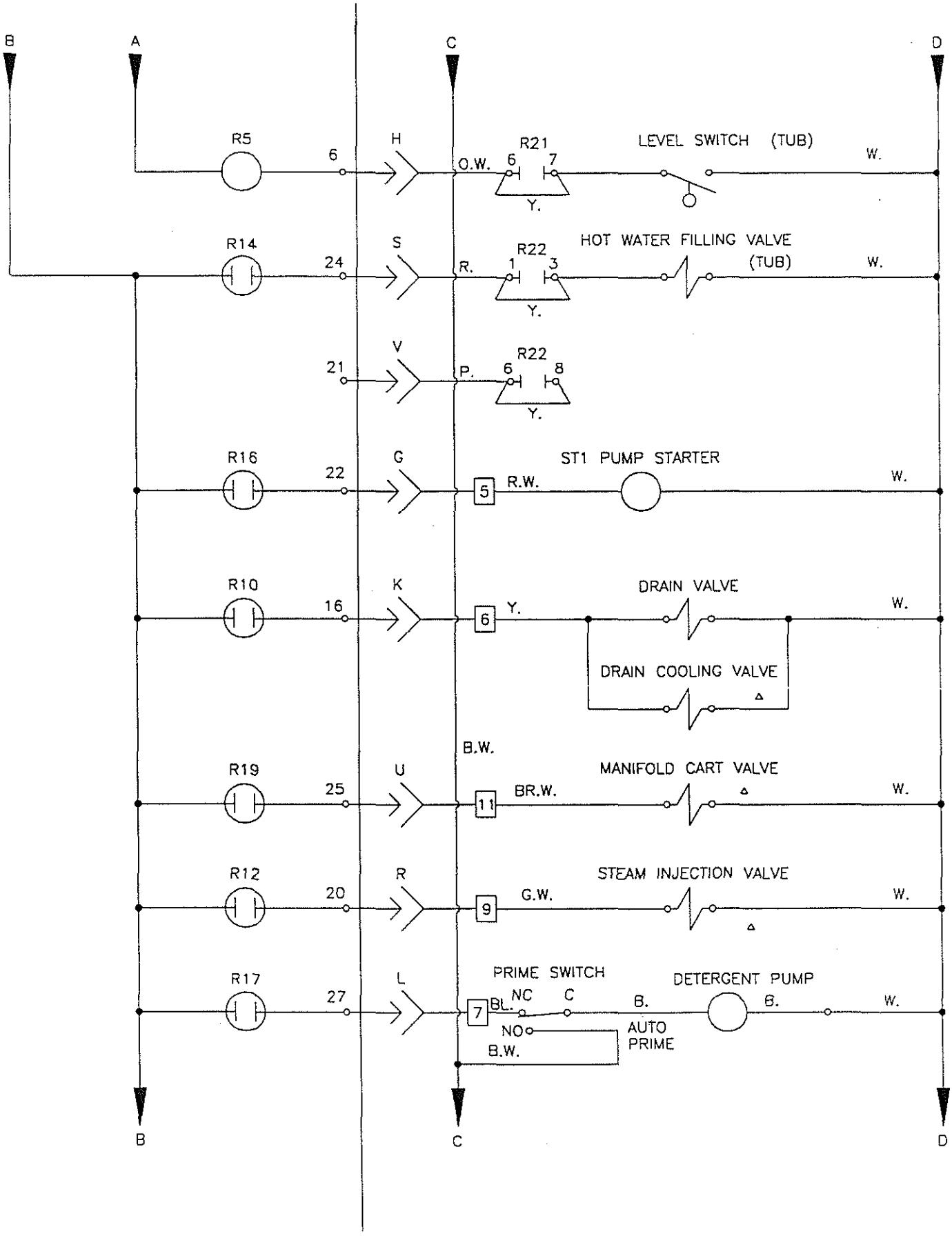
Electrical System Schematic
Without Water Temperature Booster Tank,
With or Without Condenser,
With Drying Option

P-122990-569 - Part 1 of 4



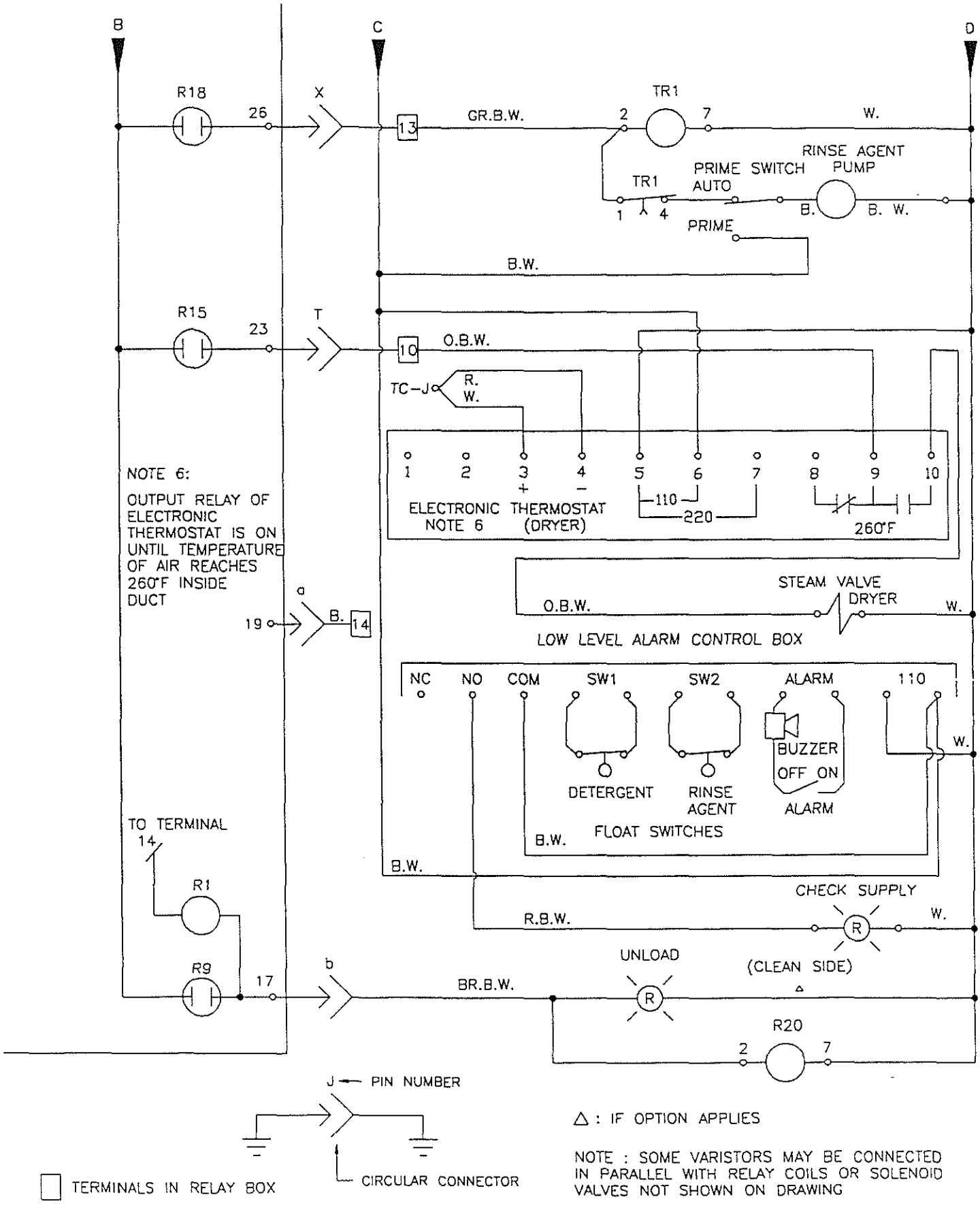
Electrical System Schematic
Without Water Temperature Booster Tank,
With or Without Condenser,
With Drying Option

P-122990-569 - Part 2 of 4



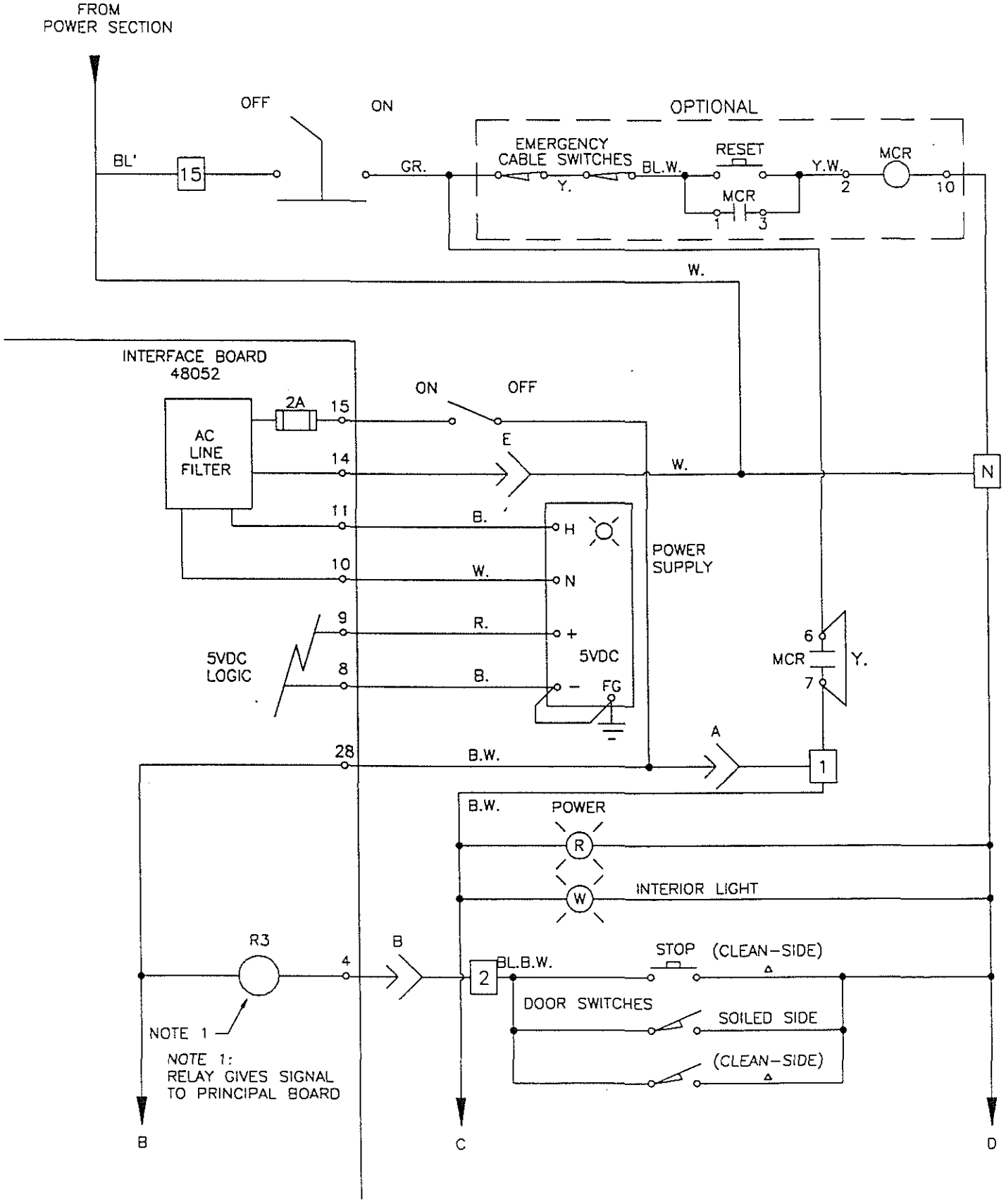
Electrical System Schematic
Without Water Temperature Booster Tank,
With or Without Condenser,
With Drying Option

P-122990-569 - Part 3 of 4



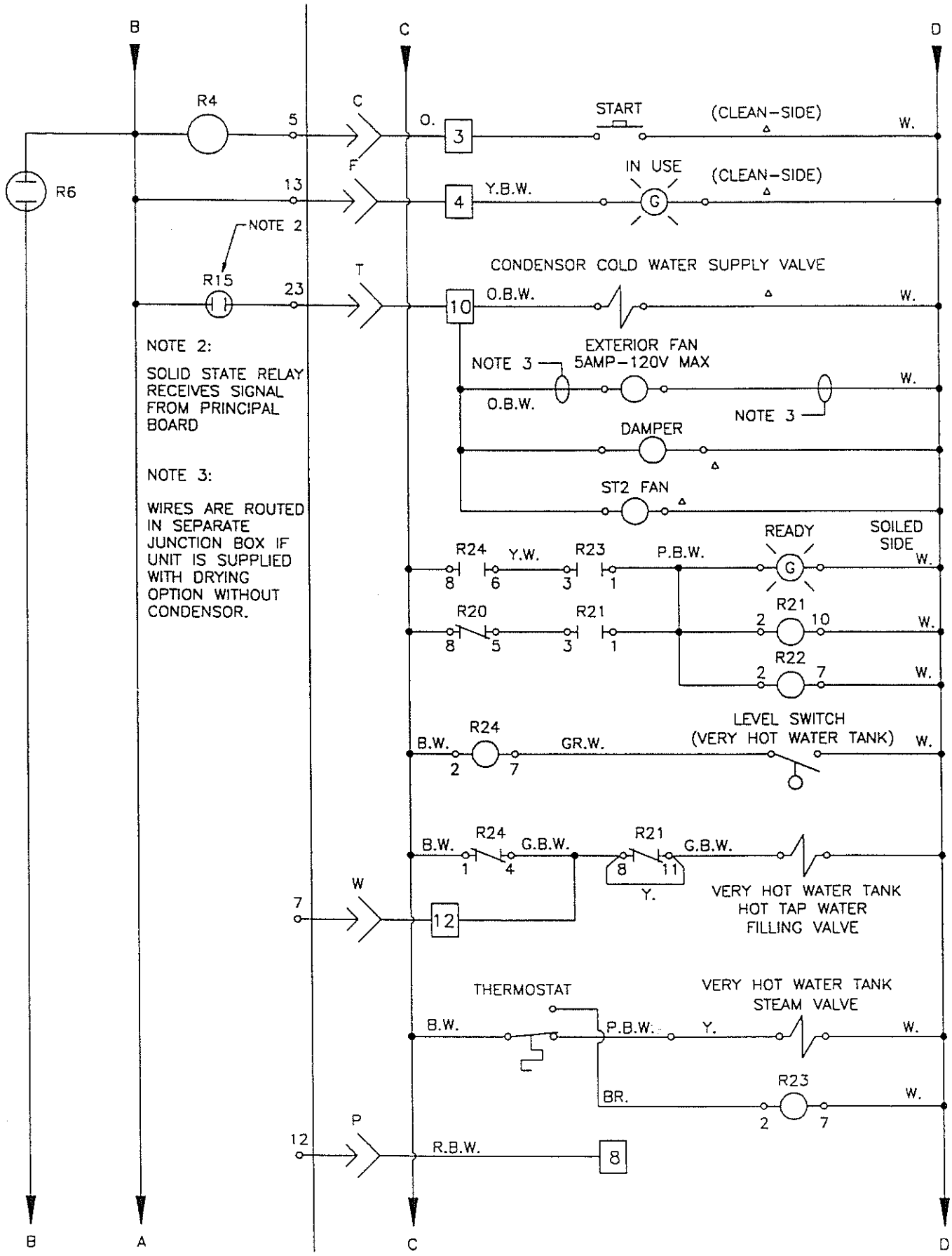
Electrical System Schematic
Without Water Temperature Booster Tank,
With or Wihtout Condenser,
With Drying Option

P-122990-569 - Part 4 of 4

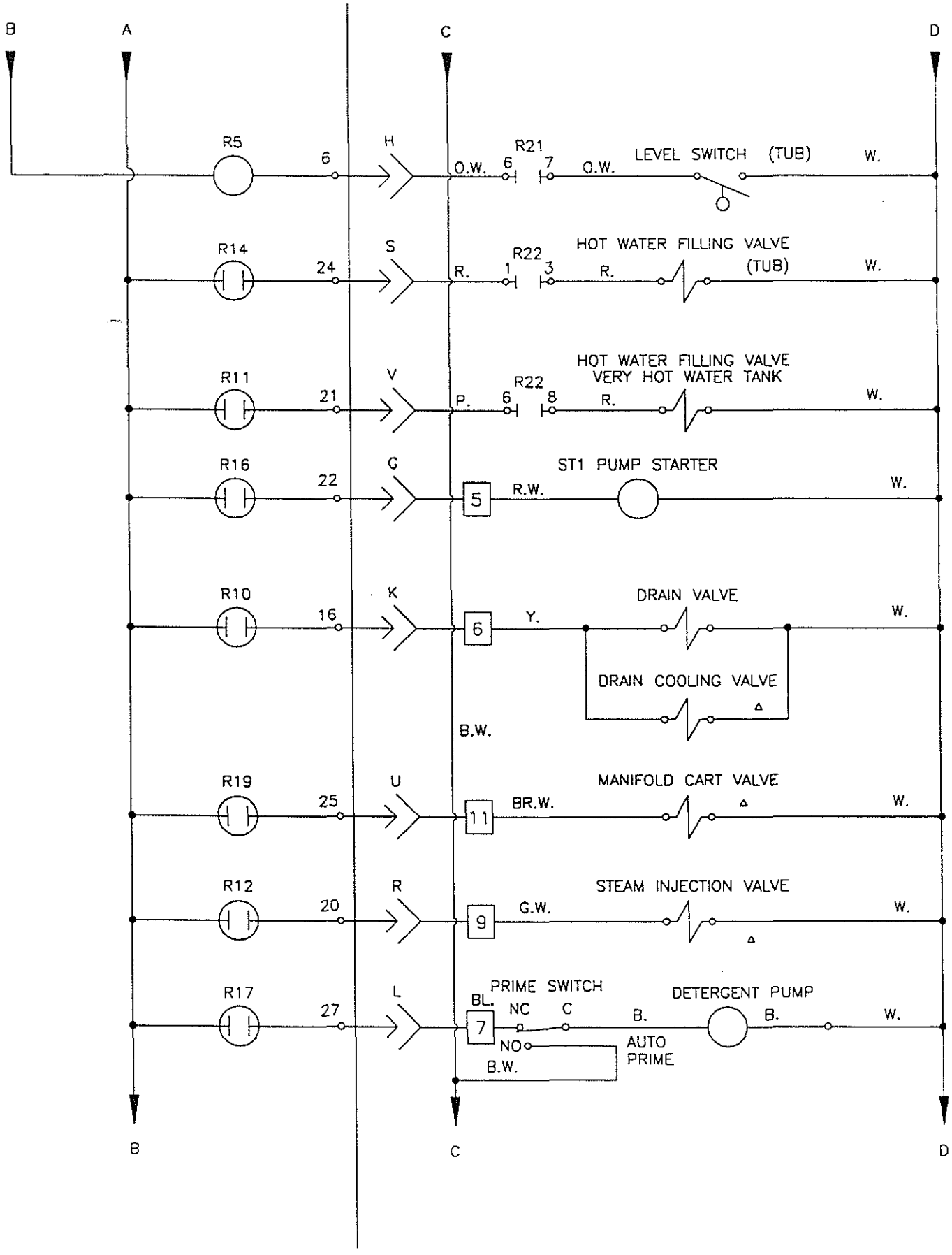


Electrical System Schematic
With Water Temperature Booster Tank,
With or Without Condenser,
Without Drying Option

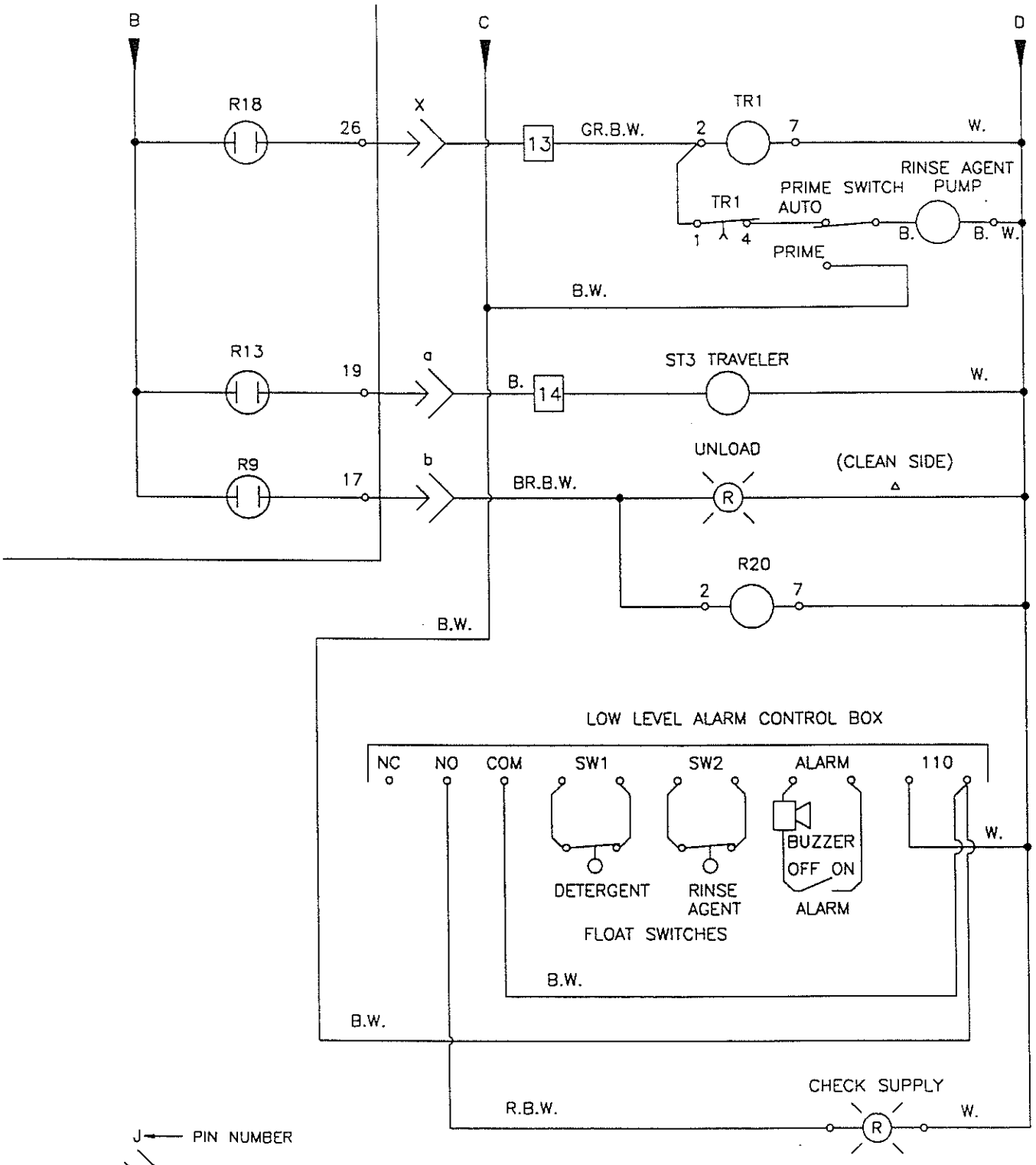
P-122990-566 - Part 1 of 4



Electrical System Schematic
With Water Temperature Booster Tank,
With or Without Condenser,
Without Drying Option
P-122990-566 - Part 2 of 4



Electrical System Schematic
With Water Temperature Booster Tank,
With or Without Condenser,
Without Drying Option
P-122990-566 - Part 3 of 4



J ← PIN NUMBER

CIRCULAR CONNECTOR

△ : IF OPTION APPLIES

NOTE : SOME VARISTORS MAY BE CONNECTED IN PARALLEL WITH RELAY COILS OR SOLENOID VALVES NOT SHOWN ON DRAWING

□ —TERMINALS IN RELAY BOX

Electrical System Schematic
With Water Temperature Booster Tank,
With or Without Condenser,
Without Drying Option
P-122990-566 - Part 4 of 4

21. When draining is complete, verify that pump stops, drain valve closes and DRAINING indicator light goes off. Check that WASH indicator light stops flashing.

• RINSE

1. Verify that RINSE indicator light flashes during rinse phase.
2. Check that FILLING indicator comes on and chamber begins to fill with hot water from building supply or, if optional water temperature booster tank is installed, with 180°F (82°C) water from booster tank.
3. If optional rinse agent injection is installed, verify that rinse agent is injected into chamber at the injection rate of 1 oz/6 seconds—approximately 2 oz (59 ml) for Model 120 without drying or 4 oz (118 ml) for Model 120 with drying; 3 oz (89 ml) for Model 220 without drying or 6 oz (177 ml) for Model 220 with drying.
4. Verify that FILLING indicator goes off when sufficient water is in chamber.
5. Verify that water temperature in chamber is 180°F (82°C).
6. Check that pump starts, that phase time appears on timer digital readout and timer begins counting down.
7. If unit is not equipped with drying option, check that travelling spray manifold starts moving.
8. If optional water temperature booster tank is installed, verify that tank refills after dispensing water to wash chamber. If optional non-vented drying package (with condenser) is installed, verify that tank refills with cold water from the condenser. Verify that tank heaters turn on to heat water.
9. Press EXTEND CYCLE touch pad. Check that EXTEND CYCLE indicator light comes on and that timer digital readout stops counting down phase time.
10. Press EXTEND CYCLE touch pad again. Check that EXTEND CYCLE indicator light goes off and that timer digital readout resumes counting down where it left off.
11. Manually actuate safety cable limit switch on top of washer (see Figure 5-7). Verify that washer stops when switch is actuated.
12. Turn power switch to RESET, then release (switch will return to ON position).
13. Press START. Verify that cycle continues from point where interrupted.

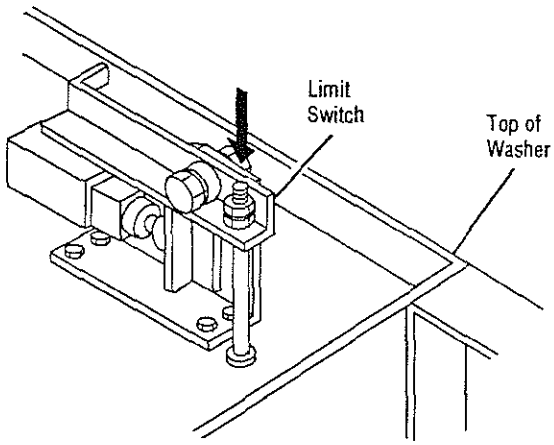


Figure 5-7. Manually Operate Safety Cable Limit Switch

14. Verify that pump stops when timer digital readout displays "0:00."
15. If unit is not equipped with drying option, check that travelling spray manifold stops.
16. Verify that drain valve opens and DRAINING indicator comes on after a 5 ±1 second delay.
17. Verify that pump starts after a 2 ±1 second delay. Check that pump runs for either 35 +10/-0 seconds (Model 120), or 45 +10/-0 seconds (Model 220).
18. When draining is complete, verify that pump stops, drain valve closes and DRAINING indicator light goes off. Check that RINSE indicator light stops flashing.

• STEAM INJECTION (if option is installed)

1. Verify that STEAM INJECTION indicator light flashes during steam injection phase.
2. Check that steam enters chamber, that phase time appears on timer digital readout and timer begins counting down.
3. If unit is not equipped with drying option, check that travelling spray manifold starts moving.
4. If unit is equipped with optional condenser and no optional drying package, check that condenser comes on.
5. If unit is equipped with optional exhaust blower and no optional drying package, check that fan motor comes on. Check that fan is rotating in proper direction (arrow on fan indicates direction).
6. If unit is equipped with optional automatic vent damper and no drying package, check that vent damper opens.

7. Verify that steam injection stops when timer digital readout displays "0:00."
8. If unit is not equipped with drying option, check that travelling spray manifold stops.
9. Check that STEAM INJECTION indicator light stops flashing.

- VAPOR REMOVAL (if no optional drying package is installed)

1. Verify that VAPOR REMOVAL indicator light flashes during vapor removal phase.
2. If unit is equipped with optional steam injection, check that condenser, exhaust blower and/or automatic vent damper (if options are installed) continue to run.
3. If unit is not equipped with optional steam injection, check that condenser, exhaust blower and/or automatic vent damper (if options are installed) come on. Check that blower fan is rotating in proper direction (arrow on fan indicates direction).
4. Check that phase time appears on timer digital readout and timer begins counting down.
5. Verify that vapor removal stops when timer digital readout displays "0:00."
6. Check that VAPOR REMOVAL indicator light stops flashing.

- DRYING (if option is installed)

1. Verify that DRYING indicator light flashes during drying phase.
2. Check that phase time appears on timer digital readout and timer begins counting down.
3. Verify that temperature of air in exhaust duct is 240°F ±10°F (115°C ±6°C) when thermostat turns off.
4. Verify that drying stops when timer digital readout displays "0:00."
5. Check that DRYING indicator light stops flashing.

- UNLOAD

1. If optional drying package is installed, verify that travelling spray manifold and dryer fan motors turn off.
2. If optional non-vented drying package is installed, verify that condenser shuts off.
3. Verify that UNLOAD indicator on front (soiled side) control panel comes on.
4. If double-door unit, verify that IN USE light on back (clean side) control panel goes off and that UNLOAD light comes on.
5. Inspect all piping for leaks.
6. Press START. Verify that cycle does not start while UNLOAD indicator is on.
7. Open door. Check that UNLOAD indicator on front control panel and, if double-door unit, on back control panel go off.
8. Remove manifold cart, if inserted in chamber.

5.5 CLEANUP

1. Turn power switch to OFF.
2. Close unit supply valves.
3. Position building electrical supply disconnect switch (circuit breaker) to OFF.
4. Inspect work area to be sure all materials used during testing have been removed.
5. Clean unit as described in *Section 4, Inspection and Maintenance.*

Section 6: Troubleshooting

This section describes the types of washer malfunctions likely to occur and indicates probable causes.

⚠ WARNING: PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD

- **Only fully qualified service personnel should make repairs and adjustments to this equipment. Maintenance done by inexperienced, unqualified personnel or installation of unauthorized parts could cause personal injury, invalidate the warranty, or result in costly damage. Contact your AMSCO sales or service representative regarding service options.**

⚠ WARNING: ELECTRIC SHOCK AND/OR BURN HAZARD

- **Lock building electrical supply disconnect switch to OFF position before performing any service on the unit. If unit is started during maintenance procedures, hot water/steam may be sprayed into washer.**

⚠ WARNING: FALL HAZARD

- **To prevent falls, keep floors dry. Promptly clean up any spills or drippage.**

⚠ WARNING: PERSONAL INJURY/BURN HAZARD

- **Keep chamber door(s) open when performing any maintenance inside chamber. When doors are closed, a cycle can be started at which time hot water would be sprayed into chamber.**

If you are unable to correct the problem with use of the Troubleshooting Chart, or if a problem occurs that is not described on the chart, please call your local AMSCO representative. They will arrange to have your washer placed in proper working condition by a factory-trained service representative. *Never permit unqualified persons to work on the washer.*

6.1 TROUBLESHOOTING CHART

Use the Troubleshooting Chart (Table 6-1) as follows:

- STATUS

  Select a symptom from this column that most nearly corresponds with the position to which the washer cycle progressed before the trouble occurred.

- TROUBLE

  Select the problem you think is most appropriate to the particular trouble symptom. The examples are presented in cycle sequence.

- CAUSE/CORRECTION

  This column lists the specific conditions that should be checked to isolate and correct the one causing the malfunction. The conditions are presented in the order in which they should be checked.

- WHERE IN MANUAL

  Location of applicable instructions and/or illustrations are provided in this area. The illustrations or instructions are identified by figure number, section or table number.

Table 6-1. Troubleshooting Chart

Status	Trouble	Cause/Correction	Where To Find
1. Before beginning cycle.	1. Primary controls (timer digital readout, START and STOP touch pads, cycle status LED indicators) not operating.	1) Faulty control board – replace control board.	Sec. 7.2.4

Table 6-1. Troubleshooting Chart (continued)			
Status	**Trouble**	**Cause/Correction**	**Where To Find**
1. Before beginning cycle (continued).	2. Cycle does not start when START is pressed.	1) Power switch not set to ON – turn power ON.	–
		2) READY light not ON – wait for READY light to come on, then press START.	–
		3) Chamber not unloaded after previous cycle – check that UNLOAD light is off. If light is on, open door and remove load. Place new load in chamber, close door and then press START.	–
		4) Building electrical supply disconnect switch (circuit breaker) set to OFF – position to ON.	–
		5) Chamber door(s) not fully closed – close door(s).	–
		6) Faulty door microswitch mechanism or contact – repair or replace switch as necessary.	Sec. 7.3.1
		7) Safety cable activated and power switch not turned to RESET – turn power switch to RESET, then press START.	–
		8) Safety cable too tight – check system and cable tension.	Fig. 8-11
		9) Blown fuses in electrical box – replace fuses.	Fig. 8-5
		10) One or more thermal overload protectors (in electrical box) tripped – reset.	Fig. 8-5
		11) Wiring connections loose – check electrical system and make adjustments as necessary.	Sec. 6.2
	3. No response when one or more touch pads are pressed.	1) Faulty intermediary board – check applicable board. Replace if necessary.	Sec. 7.2.3
		2) Faulty control board – replace control board.	Sec. 7.2.4
	4. One or more LEDs do not light.	1) Faulty intermediary board – check applicable board. Replace if necessary.	Sec. 7.2.3
		2) Faulty control board – replace control board.	Sec. 7.2.4
	5. Readouts are not completely displayed.	1) Faulty intermediary board – check applicable board. Replace if necessary.	Sec. 7.2.3
		2) Faulty control board – replace control board.	Sec. 7.2.4
	6. Control panel not energized; LEDs not on, no response when touch pads are pressed.	1) Toggle switch in control box next to power supply OFF – position to ON.	Fig. 8-4
		2) Blown 2 Amp fuse on principal board – replace fuse.	Fig. 8-4
		3) Faulty control board - replace control board.	Sec. 7.2.4
2. During a cycle.	1. Control outputs not being sent to unit (i.e., valves not opening).	1) Blown 6 Amp fuse near power supply in control box – replace fuse.	Fig. 8-4
		2) Wiring connections to interface board loose or disconnected – check wiring connections.	Sec. 6.2 & 7.2.7
		3) Faulty relay(s) on interface board – check applicable relays; replace as necessary.	Sec. 7.2.7

Table 6-1. Troubleshooting Chart (continued)			
Status	**Trouble**	**Cause/Correction**	**Where To Find**
2. During a cycle (continued).	2. Insufficient or no water entering chamber through travelling spray manifold.	1) Unit not level – add shims under unit frame as necessary.	–
		2) Supply valves not fully open – open building and washer supply valves. Supply line pressure must be between 35 and 50 psig (2.46 and 3.52 kg/cm^2).	Fig. 8-12 & 8-14
		3) Travelling spray manifold nozzles clogged – clean nozzles.	Sec. 4.1.2
		4) Travelling spray manifold hose filter clogged – clean filter.	Sec. 4.1.2
		5) Supply line from pump to travelling spray manifold is disconnected or strainer is clogged – connect supply line and/or clean strainer.	Fig. 8-12
		6) Bottom chamber filters clogged – clean filters.	Sec. 4.1.1
		7) Drain valve is leaking – replace if necessary.	Sec. 7.8.1
		8) Pump rotating in wrong direction – check that pump is rotating correctly, as indicated by arrow.	Fig. 8-12
	3. Travelling spray manifold does not move.	1) Traveller blocked by object in chamber – remove obstruction.	–
		2) Motor not operating – repair or replace as necessary.	Fig. 8-10
		3) Cable or drive chain not adjusted properly – examine cable and drive chain for proper placement and tension.	Fig. 8-10
		4) Friction clutch out of adjustment – adjust.	Sec. 7.6
	4. Insufficient or no water entering chamber through manifold cart (if option is installed).	1) Bottom chamber filters clogged – clean filters.	Sec. 4.1.1
		2) Supply valves not fully open – open building and washer supply valves. Supply line pressure must be between 35 and 50 psig (2.46 and 3.52 kg/cm^2).	Fig. 8-12 & 8-14
		3) Spray arm nozzles clogged – clean nozzles.	Sec. 4.1.4
		4) Sliding inlet filter clogged – clean filter.	Sec. 4.1.2
		5) MANIFOLD CART not selected on control panel – stop washer and select MANIFOLD CART.	–
		6) Cart not positioned properly over sliding inlet – check that cart is correctly positioned over sliding inlet.	–
		7) Drain valve is leaking – replace if necessary.	Sec. 7.8.1
	5. Water leaks from washer.	1) Unit not level – add shims under unit frame as necessary.	–
		2) Chamber overflowing because chamber water-level switch is malfunctioning – check electrical connections to switch. Clean switch electrode probe or replace switch as necessary.	Sec. 7.4.1
		3) Chamber overflowing because fill or drain solenoid valves not operating correctly – repair or replace as necessary. Check voltage to valves; if no voltage, check relay R14 (hot-water fill valve), R11 (booster tank outlet valve) or R10 (drain valve) on interface PC board. Check wiring connections.	Sec. 7.2.7, 7.8.1 & 7.8.3
		4) Piping is leaking – check piping and tighten clamps as necessary.	Fig. 8-12
		5) Water temperature booster tank (if option is installed) overflowing – check electrical connections to booster tank water-level switch. Check operation of switch. Clean switch electrode probe or replace switch as necessary.	Sec. 7.9.1

Table 6-1. Troubleshooting Chart (continued)			
Status	**Trouble**	**Cause/Correction**	**Where To Find**
2. During a cycle (continued).	6. Insufficient or no water entering chamber during FILLING.	1) Supply valves not fully open – open building and washer supply valves. Supply line pressure must be between 35 and 50 psig (2.46 and 3.52 kg/cm²).	Fig. 8-12 & 8-14
		2) *Fill or drain solenoid valves not operating correctly – repair* or replace as necessary. Check voltage to valves; if no voltage, check relay R14 (hot-water fill valve), R11 (booster tank outlet valve) or R10 (drain valve) on interface PC board. Check wiring connections.	*Sec. 7.2.7,* 7.8.1 & 7.8.3
		3) Fill solenoid valve strainers dirty – clean strainers.	Fig. 8-12
		4) Chamber water-level switch malfunctioning – check electrical connections to switch. Check operation of switch. Clean switch electrode probe or replace switch as necessary.	Sec. 7.4.1
	7. Too much water entering chamber during FILLING. Water going to overflow drain.	1) Unit not level – add shims under unit frame as necessary.	–
		2) Chamber water-level switch is malfunctioning – check electrical connections to switch. Check operation of switch. Clean switch electrode probe or replace switch as necessary.	Sec. 7.4.1
		3) Fill or drain solenoid valves not operating correctly – repair or replace as necessary. Check voltage to valves; if no voltage, check relay R14 (hot-water fill valve), R11 (booster tank outlet valve) or R10 (drain valve) on interface PC board. Check wiring connections.	Sec. 7.2.7, 7.8.1 & 7.8.3
		4) Defective drain valve – check that valve is not sticking; repair or replace as necessary.	Sec. 7.8.1
		5) Drain valve not energized – check relay R10 on interface PC board. Check wiring connections.	Sec. 7.2.7
		6) Drain line plugged – flush out drain line.	Fig. 8-12
	8. Pump starts before appropriate chamber water level is reached.	1) Unit not level – add shims under unit frame as necessary.	–
		2) Chamber water-level switch is malfunctioning – check electrical connections to switch. Check operation of switch. Clean switch electrode probe or replace switch as necessary.	Sec. 7.4.1
	9. Pump does not start during a phase.	1) Overload relay on pump starter tripped – reset overload relay.	Fig. 8-5
		2) Faulty phase relay on interface board – check applicable relay. Replace if necessary.	Sec. 7.2.7
	10. Pump leaks.	1) Worn pump shaft seal – replace if necessary.	Sec. 7.7.3
		2) Worn pump-cover O-ring – replace if necessary.	Sec. 7.7.2
		3) Loose hose connection at pump – tighten clamps.	Fig. 8-12
	11. Cycle stops for no apparent reason.	1) Chamber door(s) not fully closed – close door(s).	–
		2) Faulty door microswitch mechanism or contact – repair or replace as necessary.	Sec. 7.3.1
		3) Safety cable too tight – check system and cable tension.	Fig. 8-11

Table 6-1. Troubleshooting Chart (continued)			
Status	**Trouble**	**Cause/Correction**	**Where To Find**
2. During a cycle (continued).	12. Detergent low-level alarm is on with container(s) full.	1) Low-level sensor not positioned correctly in detergent container – check that sensor is upright and that floater tip moves freely.	–
	13. Unit does not restart after safety cable has been pulled.	1) Power switch not turned to RESET – turn switch to RESET, then press START.	–
3. During WASH phase.	1. Temperature of water entering chamber is below 180°F (82°C) when water temperature option is not installed.	1) Building supply water temperature below 180°F (82°C) – increase temperature of supply water.	–
	2. If unit is equipped with water temperature booster option and VERY HOT WATER is selected, temperature of water entering chamber is below 180°F (82°C).	1) Faulty steam supply solenoid valve – repair or replace as necessary. 2) Steam supply valve not fully open – open steam supply valve. Supply line pressure must be between 50 and 60 psig (3.52 and 4.22 kg/cm²). 3) Steam strainer and/or trap dirty – clean. 4) Thermostat not set properly – check thermostat setting.	Sec. 7.8.3 Fig. 8-17 Fig. 8-17 Sec. 7.9.3
	3. No detergent entering chamber.	1) Detergent supply empty – check supply. 2) Detergent pickup tube not positioned properly in container – check that tube is placed fully into container. 3) Detergent pickup tube not primed – operate prime button to fill detergent tube. 4) Detergent pump not operating properly – repair or replace pump.	– – Fig. 8-7 Sec. 7.5
	4. Detergent suds (foam) in chamber.	1) Wrong type of detergent being used – use only non-foaming detergent. 2) Too much detergent being injected during wash phase – check injection time. Adjust potentiometer P3 on principal PC board.	Tbl. 4-1 Sec. 7.2.6
4. During RINSE phase.	1. Temperature of water entering chamber is below 180°F (82°C) when water temperature option is not installed.	1) Building supply water temperature below 180°F (82°C) – increase temperature of supply water.	–

Table 6-1. Troubleshooting Chart (continued)			
Status	**Trouble**	**Cause/Correction**	**Where To Find**
4. During RINSE phase (continued).	2. If unit is equipped with water temperature booster option and VERY HOT WATER is selected, temperature of water entering chamber is below 180°F (82°C).	1) Faulty steam supply solenoid valve – repair or replace as necessary. 2) Steam supply valve not fully open – open steam supply valve. Supply line pressure must be between 50 and 60 psig (3.52 and 4.22 kg/cm²). 3) Steam strainer and/or trap dirty – clean. 4) Thermostat not set properly – check thermostat setting.	Sec. 7.8.3 Fig. 8-17 Fig. 8-17 Sec. 7.9.3
	3. If rinse agent system is installed, no rinse agent entering chamber.	1) Rinse agent supply empty – check supply. 2) Rinse agent pickup tube not positioned properly in container – check that tube is placed fully into container. 3) Rinse agent pickup tube not primed – operate prime button to fill detergent tube. 4) Rinse agent pump not operating properly – repair or replace pump.	– – Fig. 8-7 Sec. 7.5
5. During STEAM INJECTION (if option is installed) phase.	1. Little or no steam entering chamber.	1) Faulty steam supply solenoid valve – repair or replace as necessary. 2) Steam supply valve not fully open – open steam supply valve. Supply line pressure must be between 50 and 60 psig (3.52 and 4.22 kg/cm²). 3) Steam strainer and/or trap dirty – clean. 4) Travelling spray manifold nozzles clogged – clean.	Sec. 7.8.3 Fig. 8-18 Fig. 8-18 Sec. 4.1.2
6. During VAPOR REMOVAL phase.	1. Vapor not removed from chamber.	1) If optional automatic vent damper is installed, damper not opening – check that vent is opening; repair or replace as necessary. 2) If optional exhaust blower is installed, fan not operating properly – check rotation of fan motor. 3) Building exhaust not sufficient – check that building exhaust air flow is 1000 scfm (28 m³/min) at 1/2" negative static pressure. If air flow is below 1000 scfm, exhaust blower should be installed.	– – –
	2. Vapor removed but not condensed (units with optional condenser and no drying package).	1) Cold water isolation valve or supply solenoid valve not operating properly – repair or replace as necessary. 2) Cold water strainer clogged – clean strainer. 3) Condenser nozzles clogged – clean.	Sec. 7.8.3 Fig. 8-20 Sec. 4.1.5

Table 6-1. Troubleshooting Chart (continued)			
Status	**Trouble**	**Cause/Correction**	**Where To Find**
7. During DRYING (if option is installed) phase.	1. Incomplete drying.	1) Insufficient time set for drying – increase dry time.	–
		2) If optional rinse agent injection is installed, insufficient rinse agent being injected during rinse phase – check rinse agent supply and injection pump timing.	–
		3) Faulty steam supply solenoid valve – repair or replace as necessary.	Sec. 7.8.3
		4) Steam supply valves not fully open – open steam supply valves. Supply line pressure must be between 50 and 60 psig (3.52 and 4.22 kg/cm²).	Fig. 8-20
		5) Steam strainer and/or trap dirty – clean.	Fig. 8-20
		6) WATER SAVER set to ON – press touch pad to turn off WATER SAVER and rerun cycle.	–
8. At end of cycle.	1. Chamber does not drain completely.	1) WATER SAVER set to ON – press touch pad to turn off WATER SAVER and run RINSE (only) cycle to drain machine.	–
		2) One or both bottom filters clogged – clean filter(s).	Sec. 4.1.1
		3) Defective drain valve – check that valve is not sticking; repair or replace as necessary.	Sec. 7.8.1
		4) Drain valve not energized – check relay R10 on interface PC board. Check wiring connections.	Sec. 7.2.7
		5) Drain line plugged – flush out drain line.	Fig. 8-12
	2. Load comes out dirty.	1) Detergent supply empty – replenish detergent supply.	–
		2) Incorrect detergent being used – use recommended products.	Tbl. 4-1

6.2 SCHEMATICS

The electrical and piping schematics listed in Table 6-2 should be used in conjunction with Table 6-1, Troubleshooting Chart, to understand the electrical and piping systems in the 120/220 Reliance washers. Table 6-3 shows the wire color coding referenced in the electrical schematics.

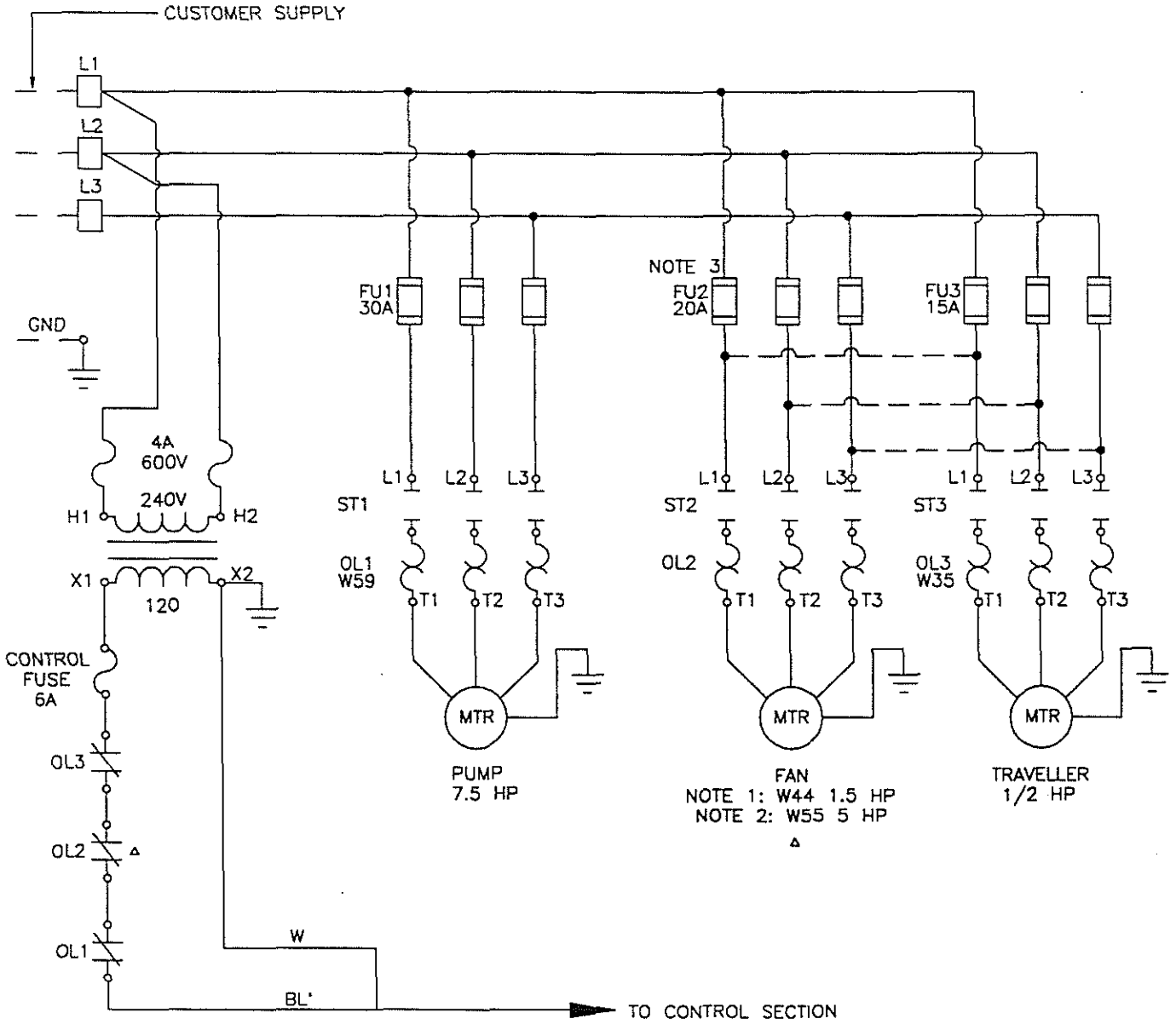
Table 6-2. Schematic Reference List

Listed below are reference drawings which are presented immediately after this table.

Schematic	Sheet	Reference Number
Electrical System Schematic, without water temperature tank, with or without condenser, without drying option	1 of 4 2 of 4 3 of 4 4 of 4	122990-570
Electrical System Schematic, without water temperature tank, with or without condenser, with drying option	1 of 4 2 of 4 3 of 4 4 of 4	122990-569
Electrical System Schematic, with water temperature tank, with or without condenser, without drying option	1 of 4 2 of 4 3 of 4 4 of 4	122990-566
Electrical System Schematic, with water temperature tank, with or without condenser, with drying option	1 of 4 2 of 4 3 of 4 4 of 4	122990-567
Power Supply Schematic, 120/208 V, 3-Phase	1 of 1	122990-562
Power Supply Schematic, 240 V, 3-Phase	1 of 1	122990-563
Power Supply Schematic, 480 V, 3-Phase	1 of 1	122990-564
Power Supply Schematic, 600 V, 3-Phase	1 of 1	122990-565
Supply Piping Schematic	1 of 1	122990-543
Recirculating System Piping Schematic	1 of 1	122990-546
Color Coding Chart Control Section	1 of 1	122990-568

Table 6-3. Wire Color Coding - Wiring Schematics

BL'.	BLUE #16	Y.W.	YELLOW-WHITE
BL.	BLUE #20	P.W.	PURPLE-WHITE
B.	BLACK	BR.W.	BROWN-WHITE
R.	RED	G.W.	GREEN-WHITE
O.	ORANGE	GR.W.	GRAY-WHITE
Y.	YELLOW	BL.B.W.	BLUE-BLACK-WHITE
BR.	BROWN	R.B.W.	RED-BLACK-WHITE
P.	PURPLE	O.B.W.	ORANGE-BLACK-WHITE
G.	GREEN	Y.B.W.	YELLOW-BLACK-WHITE
GR.	GRAY	P.B.W.	PURPLE-BLACK-WHITE
BL.W.	BLUE-WHITE	BR.B.W.	BROWN-BLACK-WHITE
B.W.	BLACK-WHITE	G.B.W.	GREEN-BLACK-WHITE
R.W.	RED-WHITE	GR.B.W.	GRAY-BLACK-WHITE
O.W.	ORANGE-WHITE		



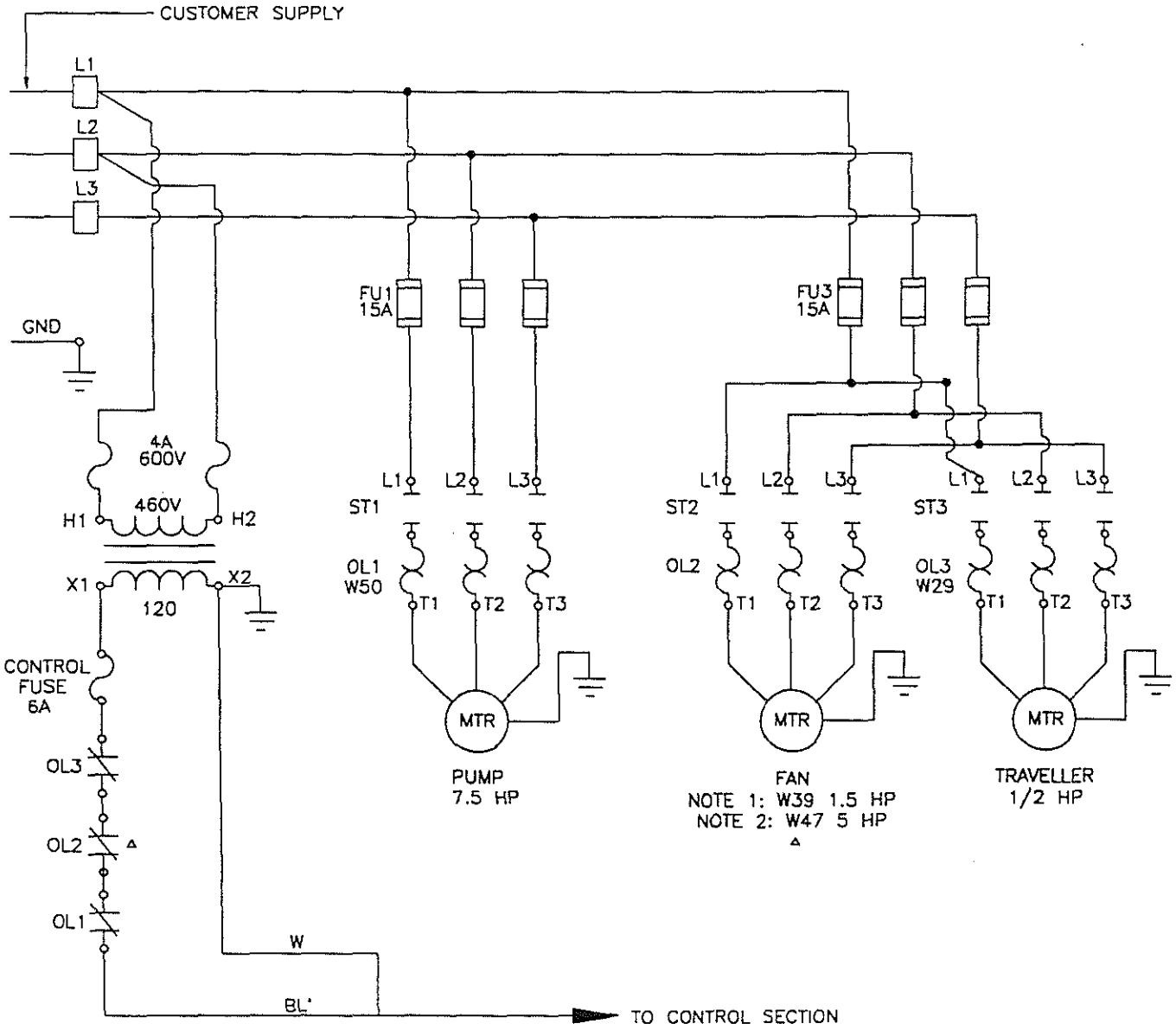
△ : IF OPTION APPLIES

NOTE 1: 1.5 HP FAN MOTOR IS USED FOR UNIT WITH VAPOR REMOVAL OPTION.

NOTE 2: 5 HP FAN MOTOR IS USED FOR UNIT WITH DRYING OPTION.

NOTE 3: 20 AMP. FUSES ARE PROVIDED ONLY WITH 5 HP FAN OTHERWISE FAN AND TRAVELLER ARE PROTECTED BY FU3

Power Supply Schematic
240 V, 3-Phase
P-122990-563

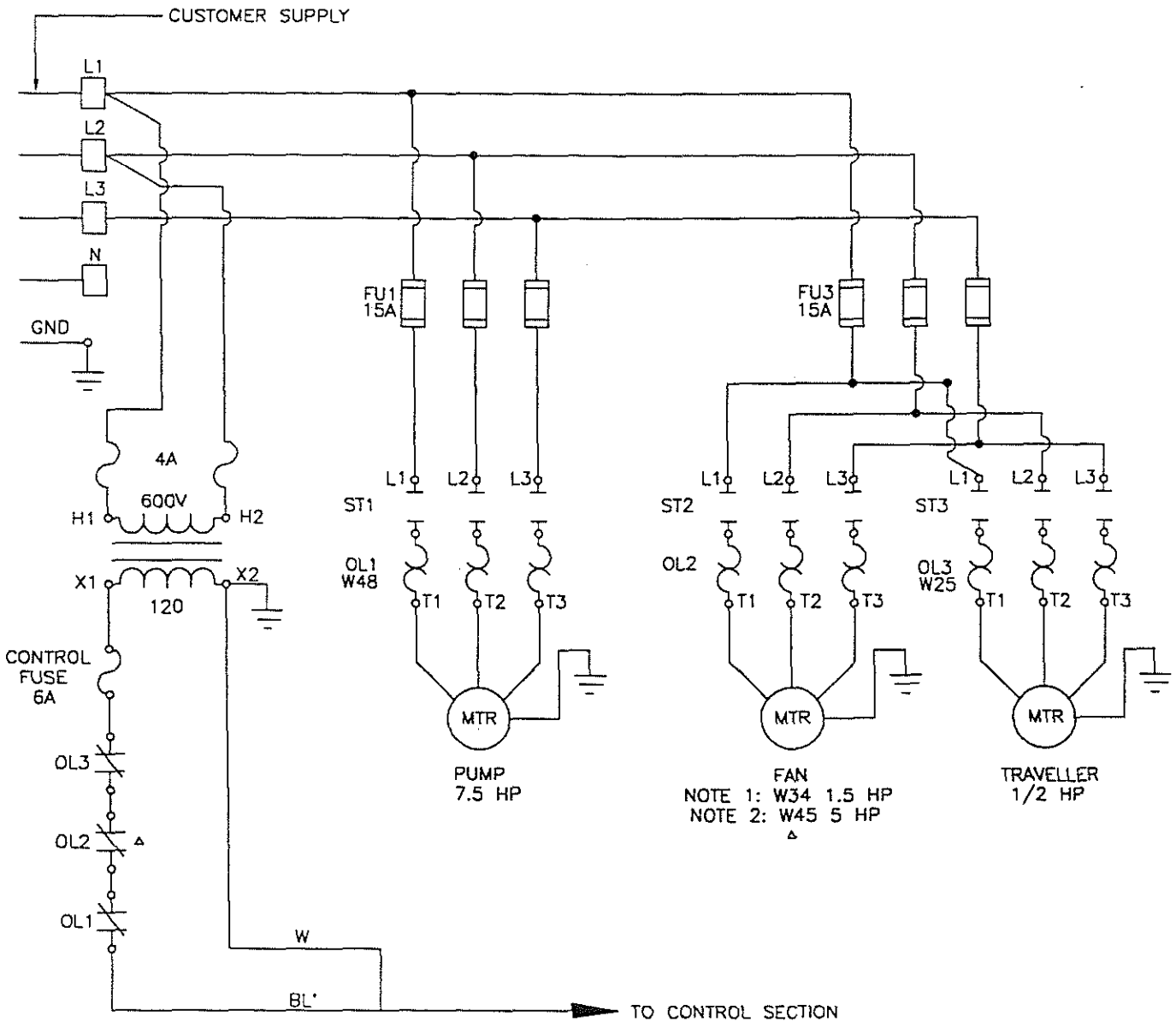


△ : IF OPTION APPLIES

NOTE 1: 1.5 HP FAN MOTOR IS USED FOR UNIT WITH VAPOR REMOVAL OPTION.

NOTE 2: 5 HP FAN MOTOR IS USED FOR UNIT WITH DRYING OPTION.

Power Supply Schematic
480 V, 3-Phase
P-122990-564

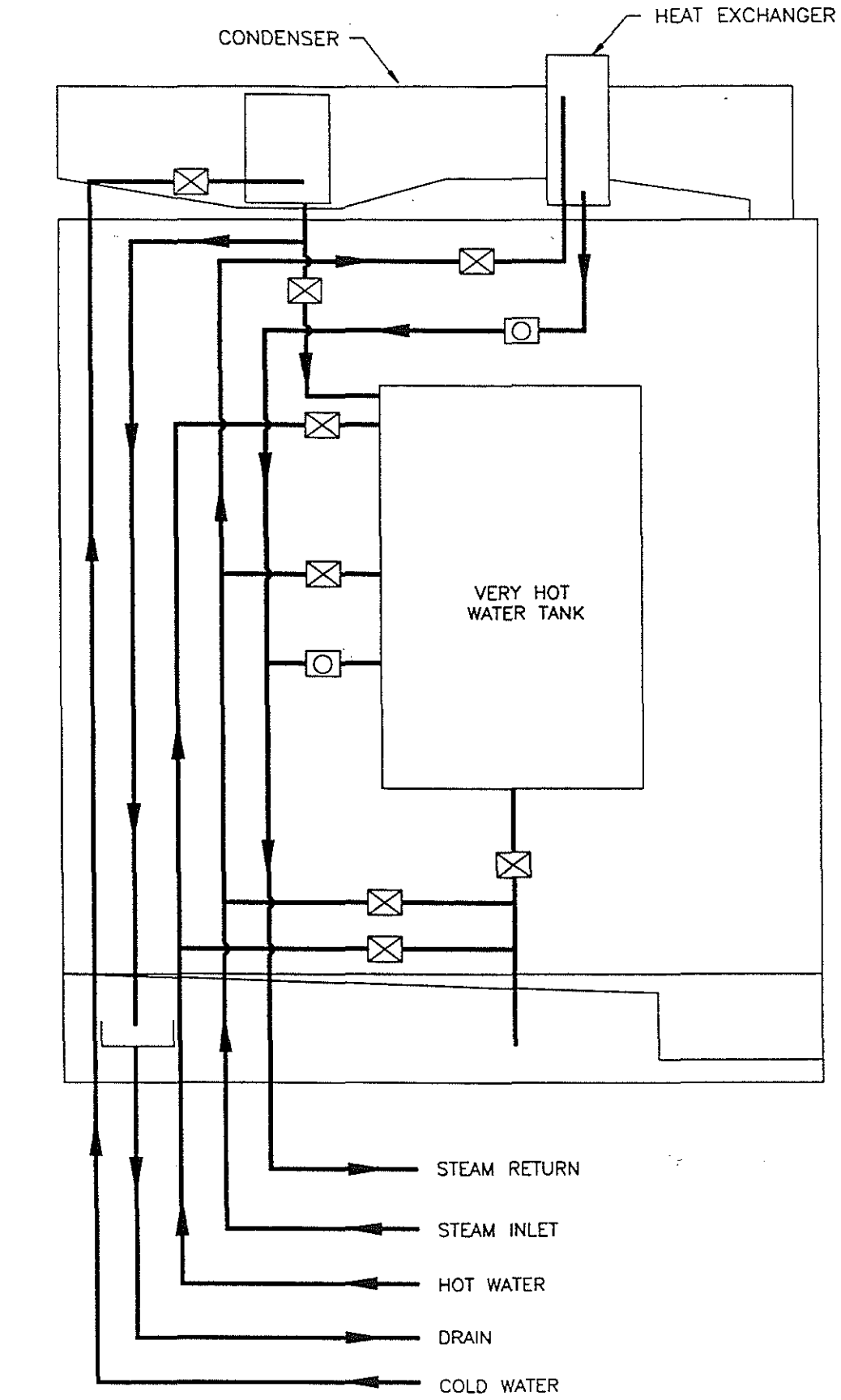


△ : IF OPTION APPLIES

NOTE 1: 1.5 HP FAN MOTOR IS USED FOR UNIT WITH VAPOR REMOVAL OPTION.

NOTE 2: 5 HP FAN MOTOR IS USED FOR UNIT WITH DRYING OPTION.

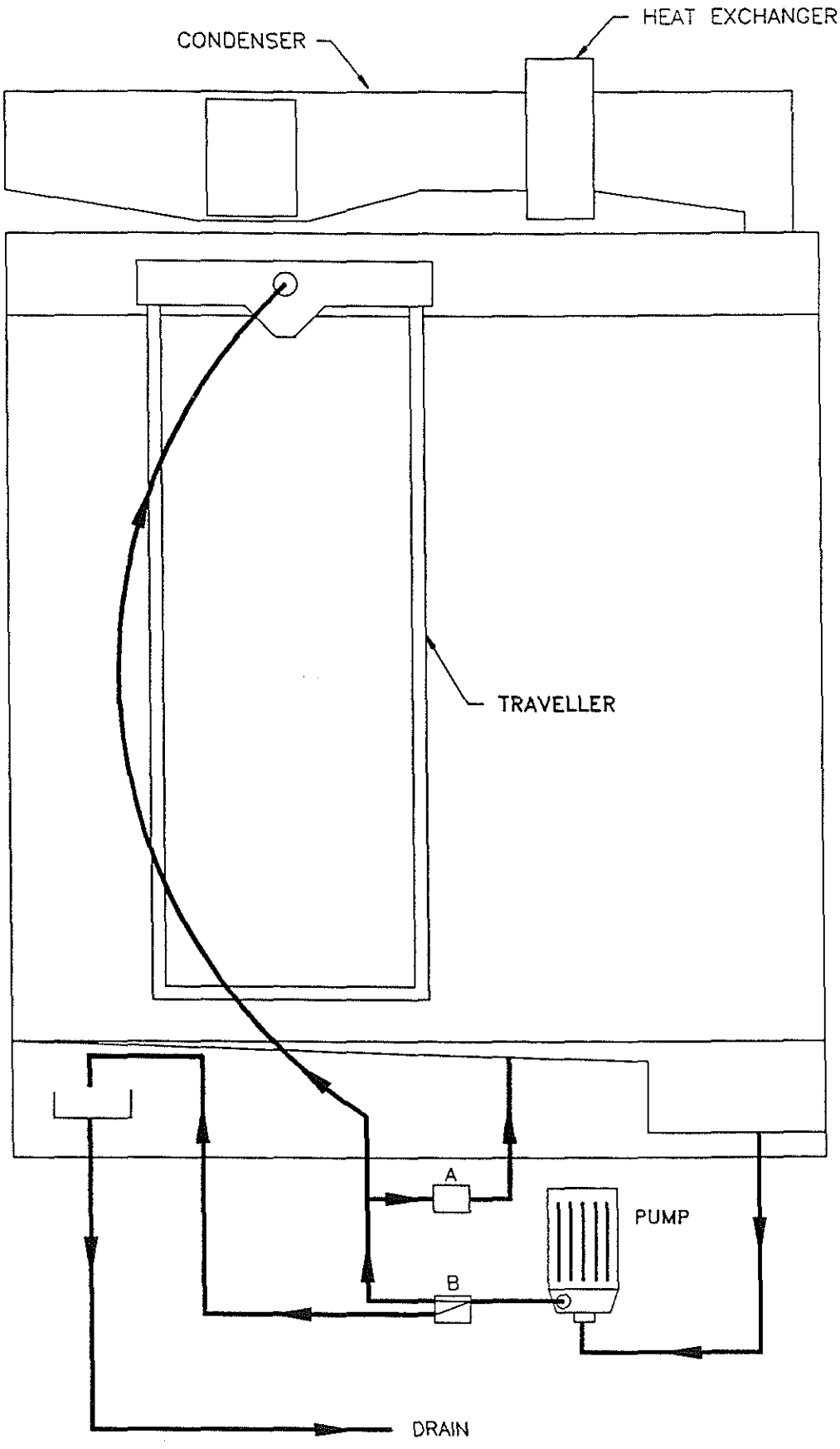
Power Supply Schematic
600 V, 3-Phase
P-122990-565



SOLENOID VALVE

STEAM TRAP

Supply Piping Schematic
P-122990-543



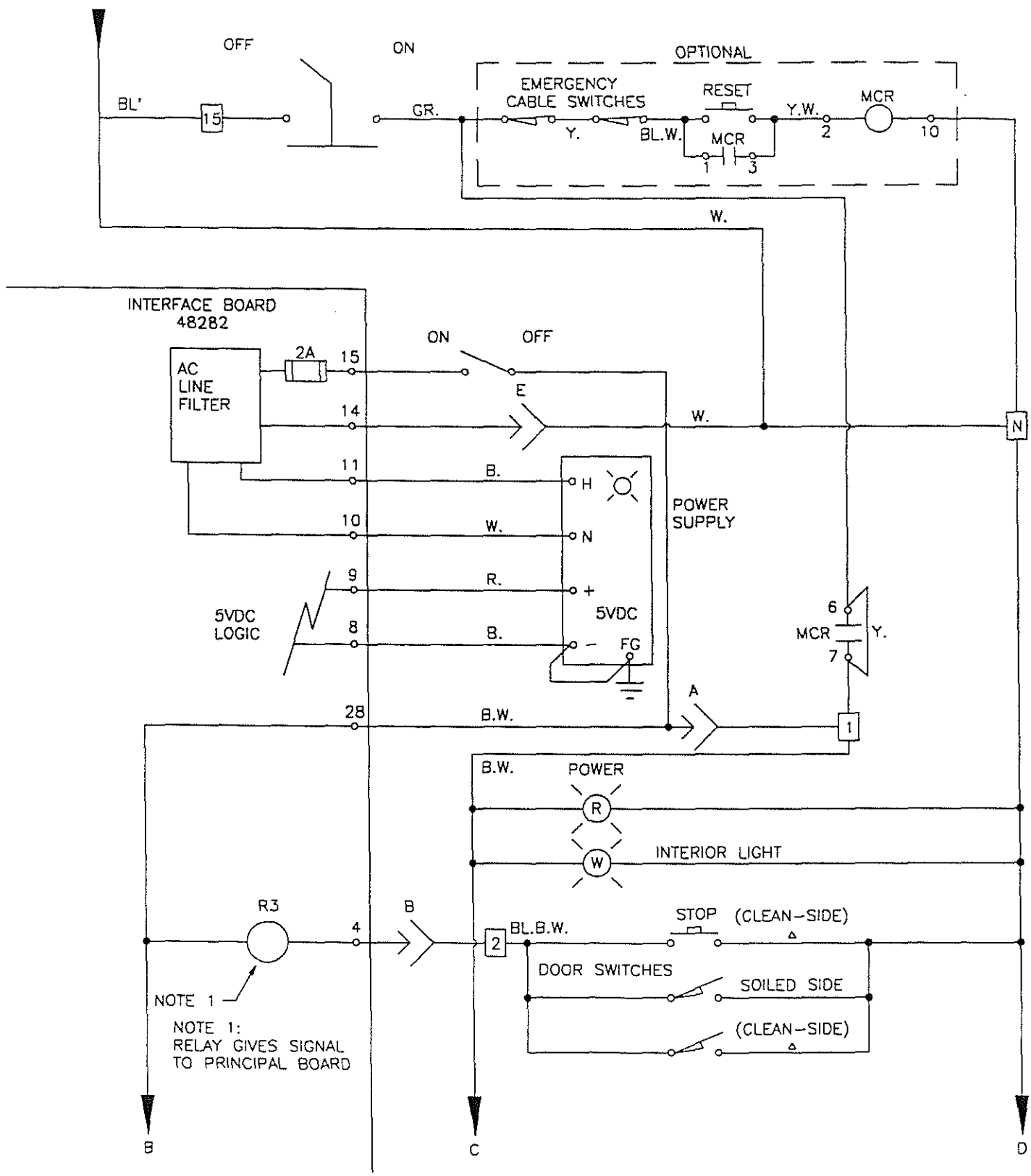
A
MANIFOLD CART VALVE

B
3-WAY VALVE

Recirculating System Piping Schematic
P-122990-546

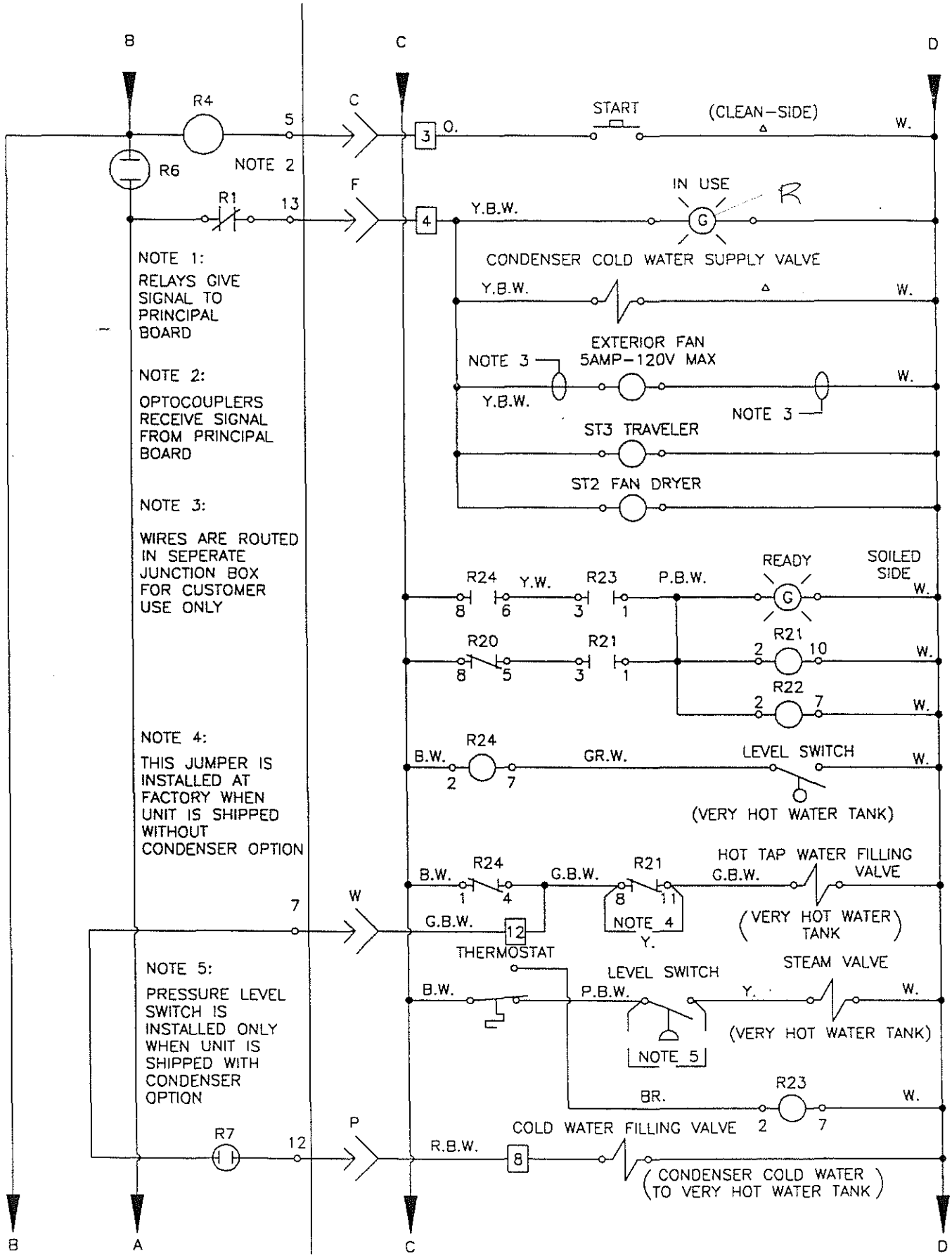
BL'.	BLUE #16
BL.	BLUE #20
B.	BLACK
R.	RED
O.	ORANGE
Y.	YELLOW
BR.	BROWN
P.	PURPLE
G.	GREEN
GR.	GRAY
BL.W.	BLUE–WHITE
B.W.	BLACK–WHITE
R.W.	RED–WHITE
O.W.	ORANGE–WHITE
Y.W.	YELLOW–WHITE
P.W.	PURPLE–WHITE
BR.W.	BROWN–WHITE
G.W.	GREEN–WHITE
GR.W.	GRAY–WHITE
BL.B.W.	BLUE–BLACK–WHITE
R.B.W.	RED–BLACK–WHITE
O.B.W.	ORANGE–BLACK–WHITE
Y.B.W.	YELLOW–BLACK–WHITE
P.B.W.	PURPLE–BLACK–WHITE
BR.B.W.	BROWN–BLACK–WHITE
G.B.W.	GREEN–BLACK–WHITE
GR.B.W.	GRAY–BLACK–WHITE

Color Coding Chart Control Section
P-122990-568



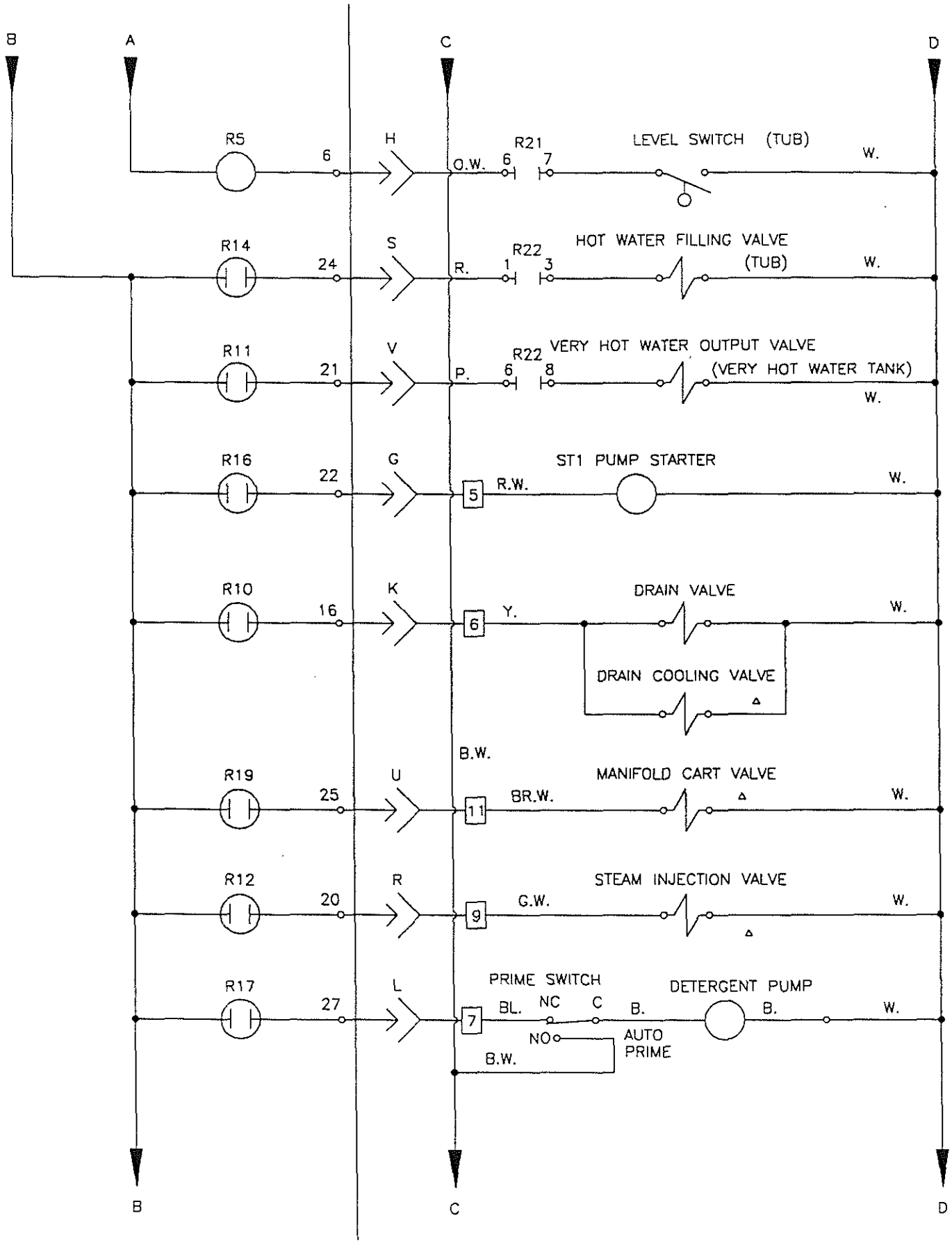
Electrical System Schematic
With Water Temperature Booster Tank,
With or Without Condenser,
With Drying Option

P-122990-567 - Part 1 of 4



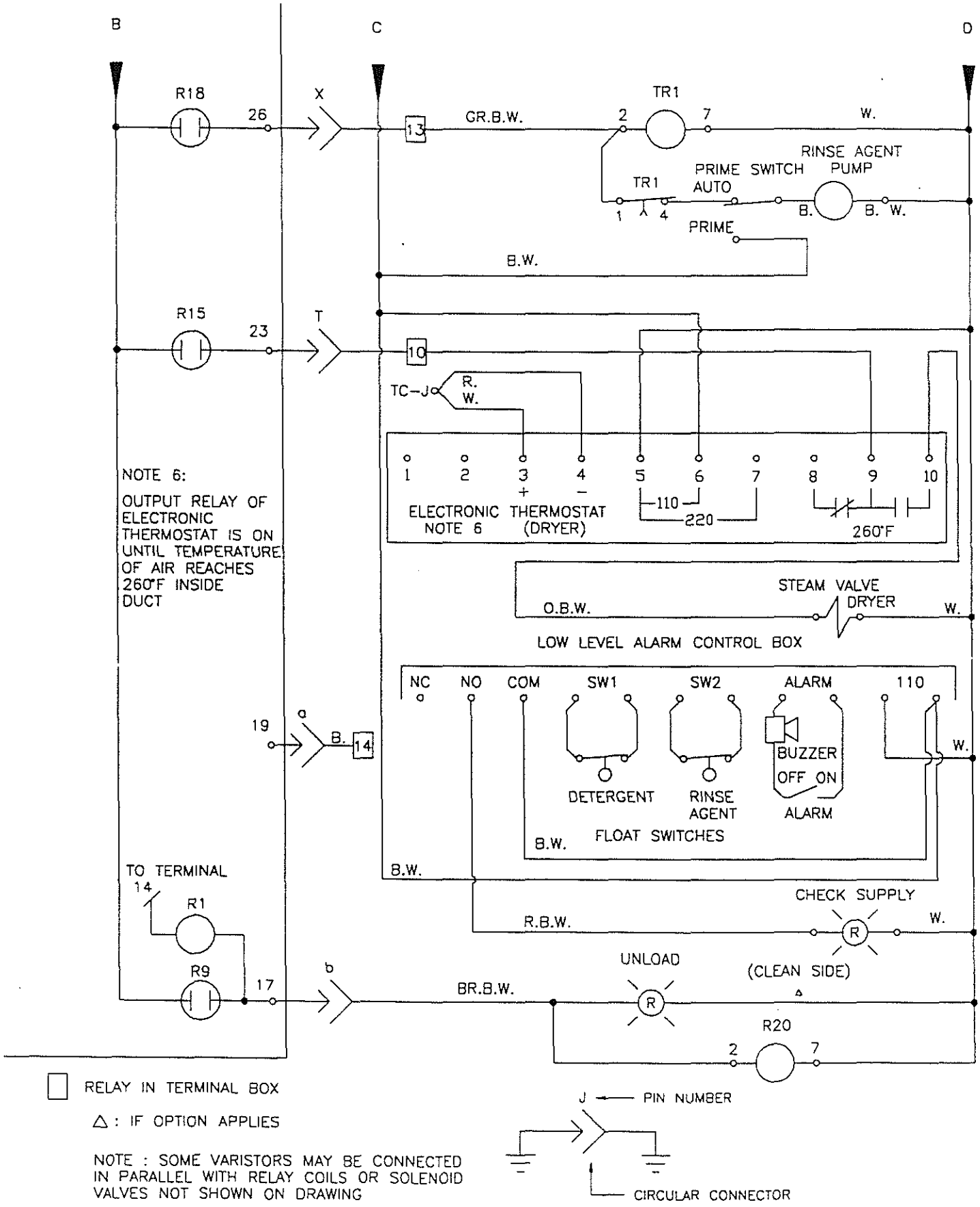
Electrical System Schematic
With Water Temperature Booster Tank,
With or Without Condenser,
With Drying Option

P-122990-567 - Part 2 of 4



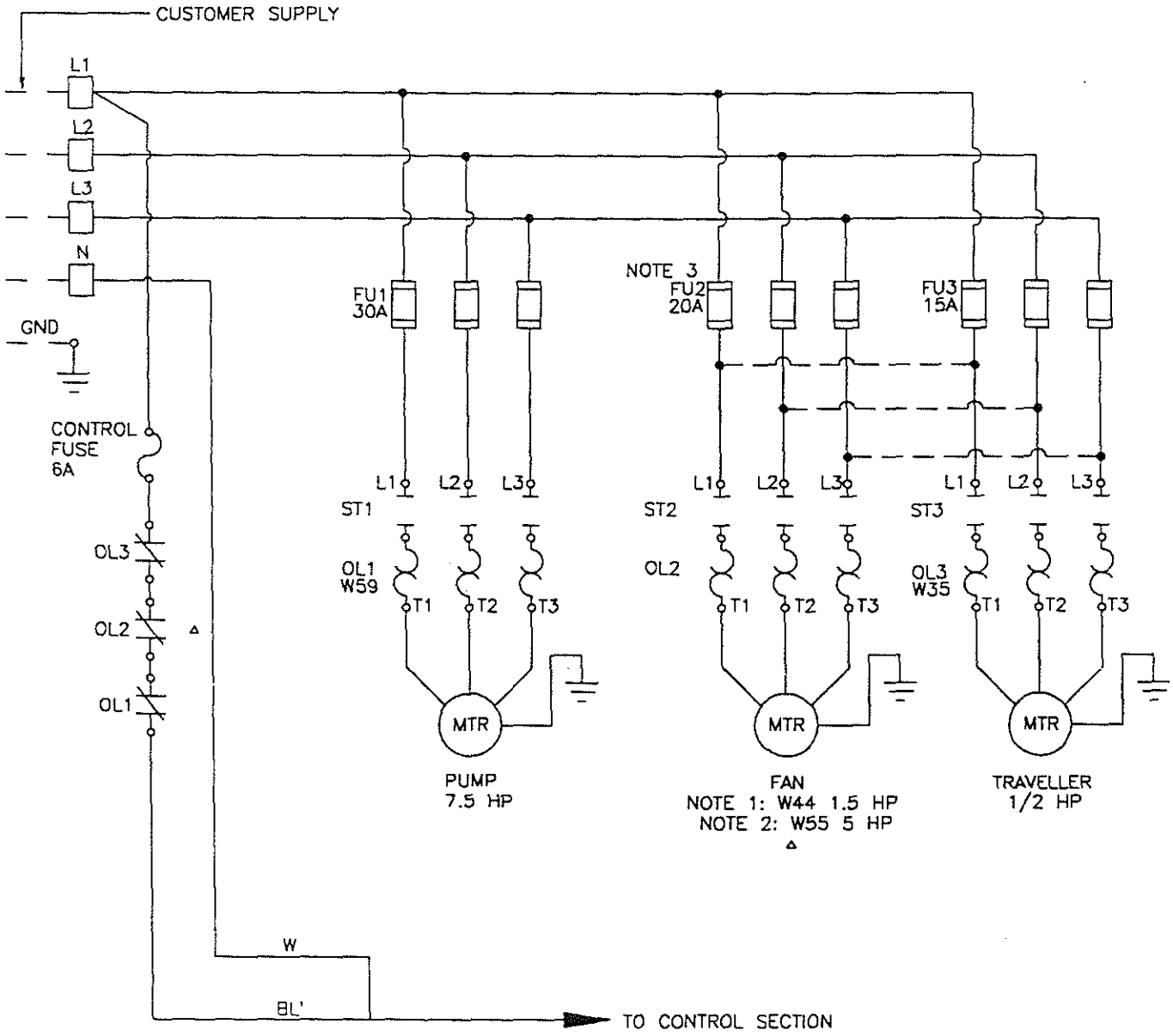
Electrical System Schematic
With Water Temperature Booster Tank,
With or Without Condenser,
With Drying Option

P-122990-567 - Part 3 of 4



Electrical System Schematic
With Water Temperature Booster Tank,
With or Without Condenser,
With Drying Option

P-122990-567 - Part 4 of 4



△ : IF OPTION APPLIES

NOTE 1: 1.5 HP FAN MOTOR IS USED FOR UNIT WITH VAPOR REMOVAL OPTION.

NOTE 2: 5 HP FAN MOTOR IS USED FOR UNIT WITH DRYING OPTION.

NOTE 3: 20 AMP. FUSES ARE PROVIDED ONLY WITH 5 HP MOTOR OTHERWISE FAN AND TRAVELLER ARE PROTECTED BY FU3

Power Supply Schematic
120/208 V, 3-Phase
P-122990-562

Section 7: Component Repair, Replacement and Adjustment

⚠ WARNING: PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD

- **Only fully qualified service personnel should make repairs and adjustments to this equipment. Maintenance done by inexperienced, unqualified personnel or installation of unauthorized parts could cause personal injury, invalidate the warranty or result in costly damage. Contact your AMSCO sales or service representative regarding service options.**

7.1 GENERAL

This section includes instructions for the disassembly, repair and replacement of selected washer components. Exploded views and assembly drawings showing the various parts and assemblies referred to are included in *Section 8, Exploded Views and Parts Lists.*

7.2 CONTROL

7.2.1 Recommended Electrostatic Damage (ESD) Precautions

NOTE: The following precautions should be taken whenever printed circuit boards are being handled or replaced:

1. Always use an ESD-safe container when transporting boards from one location to another.
2. No boards should be removed from their containers except at an approved static station or where personnel and machine are properly grounded.
3. At minimum, use a wrist strap grounded to the washer when removing and/or replacing PC boards.

NOTE: Failure to follow the above precautions may result in electrostatic damage to the printed circuit board. If a static discharge happens to go through an integrated circuit and the transient current pulse is not effectively diverted by protective circuitry, the current from the discharge can flow through the board and raise the temperature of internal junctions to their melting points. Damage can range from complete destruction to latent degradation.

Return Policy:

1. Put defective board into static-proof plastic bag in which replacement board was shipped.
2. Place plastic bag (with defective board) into replacement part shipping carton.
3. Initiate service order and enclose a copy with defective board. Include the following information:
   a. Reason for return (failure mode of equipment)
   b. General condition of board
   c. Quantity
   d. Individual item identification (part number, serial number, etc.)
   e. Serial number of machine from which board was removed
4. Wrap shipping carton with protective wrapper or cover (envelope, paper, box, etc.).
5. Return board (and all other microprocessor parts) to AMSCO SERVICE in Erie. Mark the package to the attention of the RETURNED MATERIALS SPECIALIST.

7.2.2 Preparing Control For Service (see Figure 7-1)

The Reliance series solid-state control is housed in a control box which can be pulled out through the front control panel for service.

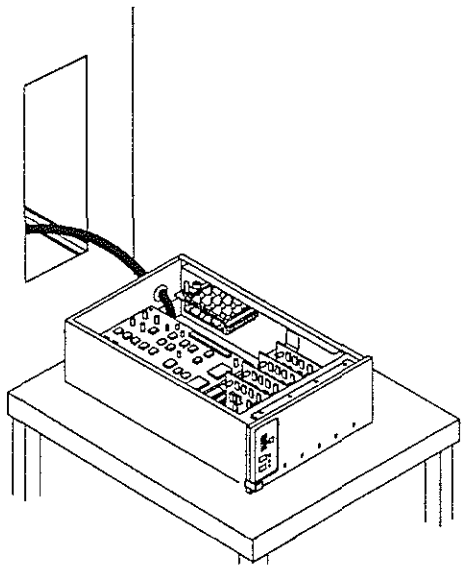


Figure 7-1. Prepare Control for Service

1. Open hinged door on control panel and remove screws holding control to front panel.
2. Pull control assembly out of unit and carefully lay it on a table, cart, etc.

7.2.3 Intermediary PC Board Replacement

CAUTION:

- **Observe the Electrostatic Precautions outlined in Section 7.2.1. Always wear a grounding wrist strap when removing or replacing PC boards.**

NOTE: There is one intermediary board (P/N 117950-294) for each cycle phase. The boards are the same, the only difference being the dip switch settings and placement of the resistor modules.

NOTE: Toggle switch next to power supply turns off 5 VDC current to logic circuitry.

1. Position toggle switch next to power supply to OFF (see Figure 7-2).
2. Remove plastic brace holding intermediary boards in place (see Figure 7-3).

NOTE: If touch pad for one phase is not working properly (i.e., no response when touch pad is pressed, LED not lighting, etc.), the intermediary board for that function may be faulty.

3. Check intermediary board as follows:

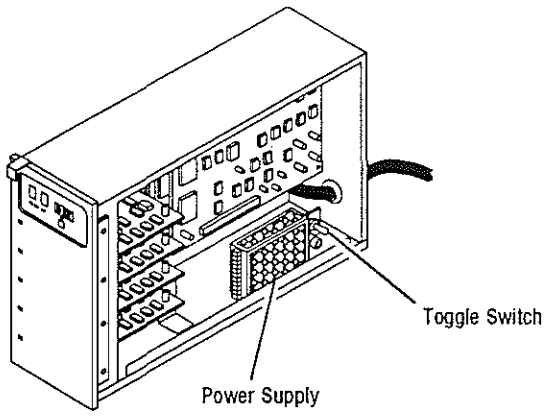


Figure 7-2. Power Supply Toggle Switch

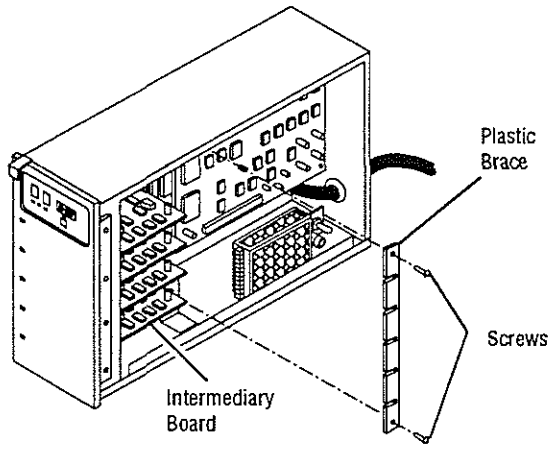


Figure 7-3. Remove Plastic Brace

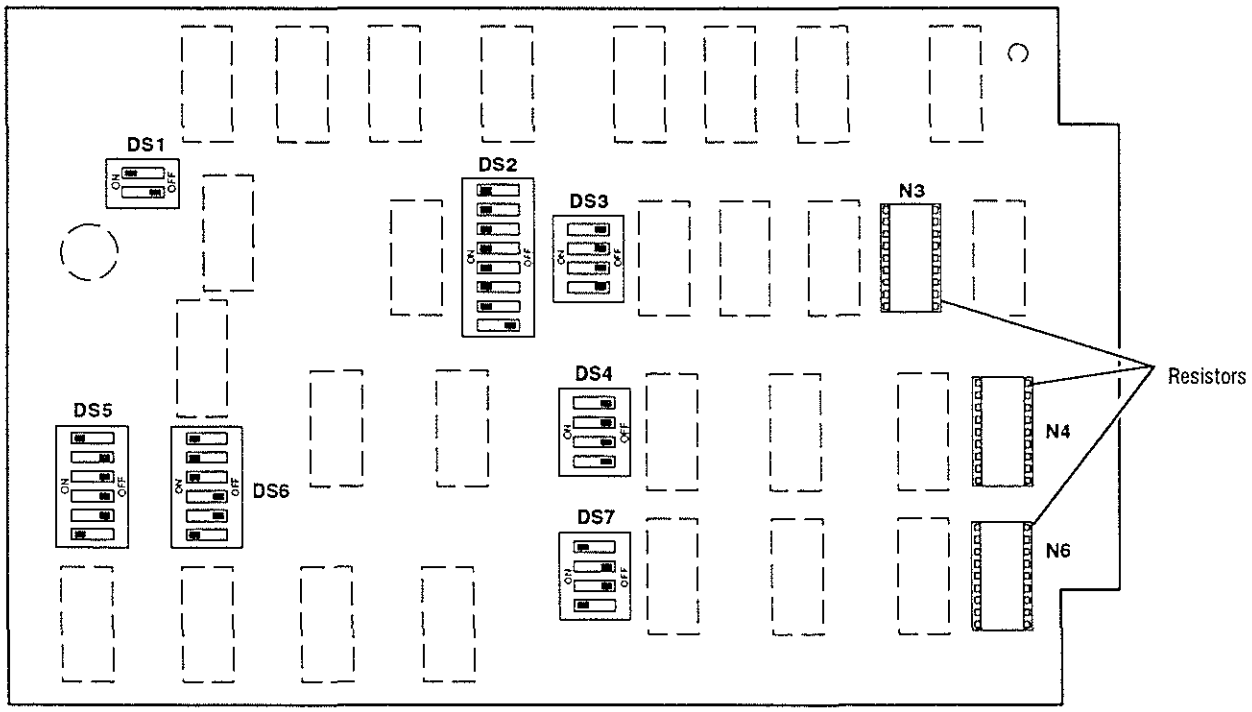


Figure 7-4. Intermediary PC Board

a. Unplug intermediary board for non-functioning phase from control board.

b. Unplug an intermediary board for a functioning phase from control board.

c. Make a note of the dip switch settings (DS1, DS2, DS3, DS4, DS5, DS6 and DS7) on suspected faulty board so that they can be reset the same way after testing (see Figure 7-4 for location of dip switches).

d. Set up the suspected faulty board to match the functioning board, i.e., make same dip switch settings and make sure resistor is in same position (N3, N4 or N6).

NOTE: When plugging intermediary board into control board, make sure intermediary board is right side up and that it is completely plugged into control board.

e. Plug suspected faulty board into control board at phase slot of functioning board.

f. Position toggle switch next to power supply to ON.

g. Operate control at phase where suspected faulty board is plugged in.

If it works in new position, then intermediary board is not faulty and control board may need to be replaced. (Refer to Section 7.2.4 for control board replacement.)

h. Position toggle switch to OFF. Unplug board and return dip switches to original settings and resistor to original location (if moved).

4. If board still does not work in new location, then replace intermediary board as follows:

a. Position toggle switch next to power supply to OFF.

NOTE: See Table 7-1 below for proper dip switch setting order and description of dip switches and resistors. See Tables 7-2 through 7-8 for dip switch settings.

b. Make dip switch settings (DS1 through DS7) on new board match settings on board being replaced. Unplug resistor from old board and place it in same location (i.e., N3, N4 or N6) on new board.

NOTE: When plugging intermediary board into control board, make sure intermediary board is right side up and that it is completely plugged into control board.

Table 7-1. Intermediary Board Dip Switches and Resistors

Dip Switch Setting Order*	Dip Switch	Description**
1	DS1	Default status, phase selector (ON/OFF)
2	DS5, Switches #3 & #4	Default temperature setting, first phase
3	DS5, Switches #1, #2, #5 & #6	Default temperature selection sequence and choices, first phase
4	DS7	Default phase time (minutes), first phase
5	DS3	Default number of additional phases***
6	DS2	Maximum number of additional phases that can be selected - number must match or exceed default number set by DS3
7	DS6, Switches #3 & #4	Default temperature setting, additional phase(s)
8	DS6, Switches #1, #2, #5 & #6	Default temperature selection sequence and choices, additional phase(s)
9	DS4	Default phase time (minutes), additional phase(s)****

Resistor	Displays Enabled
N3	Additional phases display
N4	Additional phases phase time display
N6	Phase time display

* *When making dip switch settings on a new board or changing settings on an existing board, dip switches must be set in the proper order.*

** *Default settings are those present on power-up. Any cycle phase settings made by the operator are retained in memory until power is turned off or a power outage occurs. When this happens, control returns to the default settings.*

*** *Resistor chip N3 (P/N 117950-772) must be inserted on board, in proper position, if number of additional phases is to be more than zero (0). Number of additional phases cannot exceed maximum set by DS2.*

**** *Resistor chip N4 (P/N 117950-772) must be inserted on board, in proper position, to enable the additional phase time readout.*

Table 7-2. DS1 Settings
Default Status of Phase Selector (ON or OFF)

SWITCH		PHASE SELECTOR STATUS ON POWER UP
#1	#2*	
I	I	*
O	I	ON
I	O	OFF
O	O	*

O = OFF
I = ON

** Do not make this setting—control will not function properly.*

Table 7-3. DS2 Settings
Maximum Number of Additional Phases Available

SWITCH*								NUMBER OF ADDITIONAL PHASES AVAILABLE
#1	#2	#3	#4	#5	#6	#7	#8	
O	I	O	O	O	O	O	O	0
O	O	I	O	O	O	O	O	1
O	O	O	I	O	O	O	O	2
O	O	O	O	I	O	O	O	3
O	O	O	O	O	I	O	O	4
O	O	O	O	O	O	I	O	5
O	O	O	O	O	O	O	I	6

O = OFF
I = ON

** Do not make any other combination of settings—control will not function properly.*

Table 7-4. DS3 Settings
Default Number of Additional Phases

SWITCH				NUMBER OF* ADDITIONAL PHASES ON POWER UP
#1	#2	#3	#4**	
I	I	I	N/A	0
O	I	I	N/A	1
I	O	I	N/A	2
O	O	I	N/A	3
I	I	O	N/A	4
O	I	O	N/A	5
I	O	O	N/A	6
O	O	O	N/A	***

O = OFF
I = ON

** Number must not exceed Additional Phases enabled by DS2.*
*** Position #4 is not connected.*
**** Do not make this setting—control will not function properly.*

Table 7-5. DS4 Settings
Default Phase Time (min.) for Additional Phase(s)

SWITCH				TIME SETTING (MIN)* OF ADD'L PHASES ON POWER UP
#1	#2	#3	#4	
I	I	I	I	0
O	I	I	I	1
I	O	I	I	2
O	O	I	I	3
I	I	O	I	4
O	I	O	I	5
I	O	O	I	6
O	O	O	I	7
I	I	I	O	8
O	I	I	O	9
I	O	I	O	**
O	O	I	O	**
I	I	O	O	**
O	I	O	O	**
I	O	O	O	**
O	O	O	O	**

O = OFF
I = ON

** A 0 (zero) setting gives 20 seconds.*
*** Do not make this setting—control will not function properly.*

Table 7-6. DS7 Settings
Default Phase Time (min.) for First Phase

SWITCH				TIME SETTING (MIN)* OF ADD'L PHASES ON POWER UP
#1	#2	#3	#4	
I	I	I	I	0
O	I	I	I	1
I	O	I	I	2
O	O	I	I	3
I	I	O	I	4
O	I	O	I	5
I	O	O	I	6
O	O	O	I	7
I	I	I	O	8
O	I	I	O	9
I	O	I	O	**
O	O	I	O	**
I	I	O	O	**
O	I	O	O	**
I	O	O	O	**
O	O	O	O	**

O = OFF
I = ON

** A 0 (zero) setting gives 20 seconds.*
*** Do not make this setting—control will not function properly.*

Table 7-7. DS5 Settings

Switches #3 and #4
Default Water Temperature Setting for First Phase

SWITCH #3	SWITCH #4	LED COLOR	WATER TEMP. OF PHASE ON POWER UP
I	I	GREEN	COLD (CW) from bld'g supply
O	I	YELLOW	HOT (HW) from bld'g supply
I	O	RED	VERY HOT (VHW) from bld'g supply or booster tank; heated to and/or maintained at 180°F (82°C)
O	O	NONE	*

Switches #1, #2, #5 and #6
Temperature Selection Sequence and Choices

SWITCH #1	#2	#5	#6	INITIAL** SETTING	STEPS*** 1	2	3
O	O	O	O	DEFAULT	RTN	–	–
O	O	O	I	DEFAULT	RTN	–	–
O	O	I	O	DEFAULT	HW	RTN	–
O	O	I	I	DEFAULT	HW	HW	RTN
O	I	O	O	DEFAULT	VHW	RTN	–
O	I	O	I	DEFAULT	VHW	HW	RTN
O	I	I	O	DEFAULT	CW	RTN	–
O	I	I	I	DEFAULT	CW	HW	–
I	O	O	O	DEFAULT	RTN	–	–
I	O	O	I	DEFAULT	RTN	–	–
I	O	I	O	DEFAULT	HW	VHW	RTN
I	O	I	I	DEFAULT	HW	CW	RTN
I	I	O	O	DEFAULT	VHW	VHW	RTN
I	I	O	I	DEFAULT	VHW	CW	RTN
I	I	I	O	DEFAULT	CW	VHW	RTN
I	I	I	I	DEFAULT	CW	CW	RTN

O = OFF
I = ON
CW = COLD WATER
HW = HOT WATER
VHW = VERY HOT WATER
RTN = RETURN TO INITIAL SETTING

** Do not make this setting—control will not function properly.*
*** Default water temperature as determined by setting of Switches #3 and #4.*
**** Each step corresponds to pressing the Temperature Selection touch pad once.*

Table 7-8. DS6 Settings

Switches #3 and #4
Default Water Temp. Setting for Additional Phase(s)

SWITCH #3	SWITCH #4	LED COLOR	WATER TEMP. OF PHASE ON POWER UP
I	I	GREEN	COLD (CW) from bld'g supply
O	I	YELLOW	HOT (HW) from bld'g supply
I	O	RED	VERY HOT (VHW) from bld'g supply or booster tank; heated to and/or maintained at 180°F (82°C)
O	O	NONE	*

Switches #1, #2, #5 and #6
Temperature Selection Sequence and Choices

SWITCH #1	#2	#5	#6	INITIAL** SETTING	STEPS*** 1	2	3
O	O	O	O	DEFAULT	RTN	–	–
O	O	O	I	DEFAULT	RTN	–	–
O	O	I	O	DEFAULT	HW	RTN	–
O	O	I	I	DEFAULT	HW	HW	RTN
O	I	O	O	DEFAULT	VHW	RTN	–
O	I	O	I	DEFAULT	VHW	HW	RTN
O	I	I	O	DEFAULT	CW	RTN	–
O	I	I	I	DEFAULT	CW	HW	–
I	O	O	O	DEFAULT	RTN	–	–
I	O	O	I	DEFAULT	RTN	–	–
I	O	I	O	DEFAULT	HW	VHW	RTN
I	O	I	I	DEFAULT	HW	CW	RTN
I	I	O	O	DEFAULT	VHW	VHW	RTN
I	I	O	I	DEFAULT	VHW	CW	RTN
I	I	I	O	DEFAULT	CW	VHW	RTN
I	I	I	I	DEFAULT	CW	CW	RTN

O = OFF
I = ON
CW = COLD WATER
HW = HOT WATER
VHW = VERY HOT WATER
RTN = RETURN TO INITIAL SETTING

** Do not make this setting—control will not function properly.*
*** Default water temperature as determined by setting of Switches #3 and #4.*
**** Each step corresponds to pressing the Temperature Selection touch pad once.*

c. Plug new board into proper slot on control board.

d. Replace plastic brace, adjusting so that intermediary boards are snug against control board.

e. Position toggle switch next to power supply to ON.

f. Test that control works properly.

5. Once control is functioning properly, reinsert control assembly into machine. Fasten to front panel with screws removed previously.

7.2.4 Control PC Board Replacement

⚠ CAUTION:

- **Observe the Electrostatic Precautions outlined in Section 7.2.1. Always wear a grounding wrist strap when removing or replacing PC boards.**

1. Position toggle switch next to power supply to OFF.
2. Remove plastic brace holding intermediary boards in place.
3. Unplug all intermediary boards, marking them for reinstallation. Mark applicable phase position on each board.
4. Remove 8 screws (4 on each side) holding front control panel assembly to control housing (see Figure 7-5).
5. Pull control panel assembly away from housing.
6. Unplug wire plug, noting proper position for reinstallation.
7. Remove nuts and washers holding control board to front overlay frame assembly (see Figure 7-6).
8. Lift control board off bolts.
9. Check new board. All LEDs and touch pads must be straight so that they will go through openings in control panel frame. Also check that capacitors under phase indicating lights are bent flat against board.
10. Place new board over four corner bolts in control panel frame. Press on board so that all LEDs, touch pads and readouts go through openings in frame.

NOTE: By pressing on the front overlay of each opening you should be able to feel the board contacts coming through. If contacts don't come through opening, remove board and check that contacts are all straight and that capacitors are bent flat against board, then try again. Don't push board contacts too far through openings. Contacts should not push overlay out.

11. If necessary, adjust the two nuts and washers, on bolts between board and frame, to obtain correct spacing. Once board is properly in place, replace nuts and washers holding board to frame. Check contacts again.

NOTE: Because board may be slightly bowed, contacts in the middle of the board may not be as close to overlay as those on the ends of the board. Slight bowing will be adjusted when plastic brace is replaced and adjusted.

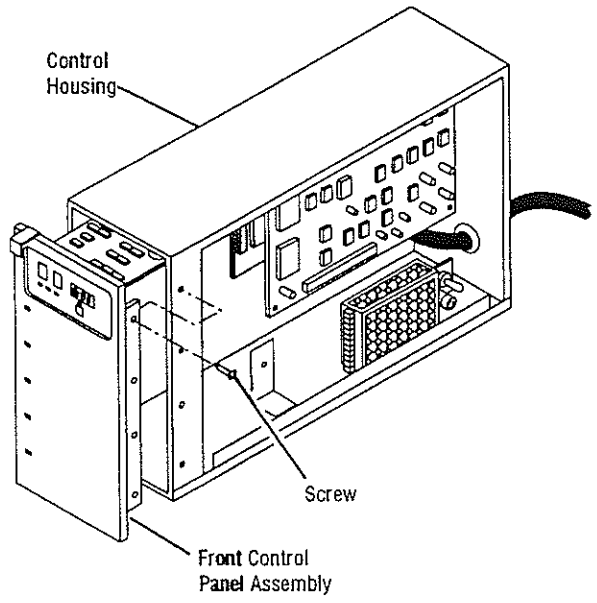


Figure 7-5. Remove Control Panel from Housing

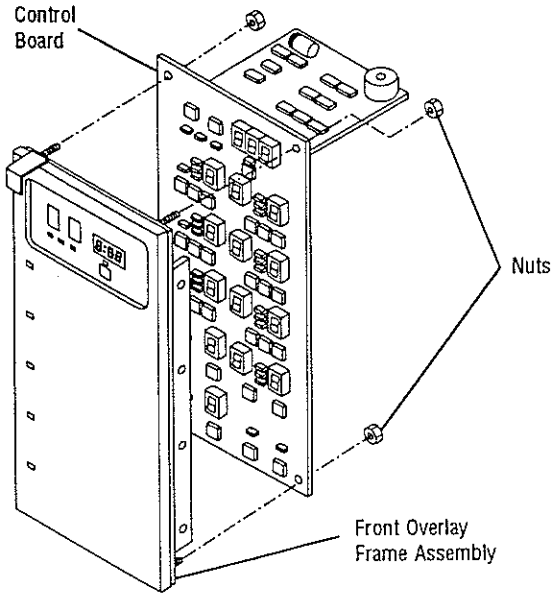


Figure 7-6. Separate Control Board from Overlay

12. Attach wire plug to control board, making sure it is in same orientation as previously.
13. Attach control panel assembly to control housing.
14. Replace intermediary boards, making sure they are firmly plugged in and that they are right side up and inserted at correct phase.
15. Replace plastic brace and adjust so that all contacts from control board touch control panel overlay. Contacts should be able to be felt through overlay, but should not push overlay out.
16. Position toggle switch next to power supply to ON. Test that all control functions are operable.
17. Once control is functioning properly, reinsert control assembly into machine. Fasten to front panel with screws removed previously.

7.2.5 Control Panel Assembly Replacement

1. Position toggle switch next to power supply to OFF.
2. Remove plastic brace holding intermediary boards in place.
3. Unplug all intermediary boards, marking them for reinstallation. Mark applicable phase position on each board.
4. Remove 8 screws (4 on each side) holding front control panel assembly to control housing (see Figure 7-5).
5. Pull control panel assembly away from housing.
6. Unplug wire plug, noting proper position for reinstallation.
7. Remove nuts and washers holding control board to front overlay frame assembly (see Figure 7-6).
8. Lift control board off bolts.
9. Place masks (5) in proper position on overlay of new control panel.
10. Check that all LEDs and touch pads on control board are straight so that they will go through openings in control panel frame. Also check that capacitors under phase indicating lights are bent flat against board.
11. Place control board over four corner bolts in control panel frame. Press on board so that all LEDs, touch pads and readouts go through openings in frame.

NOTE: By pressing on the front overlay of each opening you should be able to feel the board contacts coming through. If contacts don't come through opening, remove board and check that contacts are all straight and that capacitors are bent flat against board, then try again. Don't push board contacts too far through openings. Contacts should not push overlay out.

12. If necessary, adjust the two nuts and washers, on bolts between board and frame, to obtain correct spacing. Once board is properly in place, replace nuts and washers holding board to frame. Check contacts again.

NOTE: Because board may be slightly bowed, contacts in the middle of the board may not be as close to overlay as those on the ends of the board. Slight bowing will be adjusted when plastic brace is replaced and adjusted.

13. Attach wire plug to control board, making sure it is in same orientation as previously.
14. Reattach control panel assembly to control housing.
15. Replace intermediary boards, making sure they are firmly plugged in and that they are right side up and inserted at correct phase.
16. Replace plastic brace and adjust so that all contacts from control board touch control panel overlay. Contacts should be able to be felt through overlay, but should not push overlay out.
17. Position toggle switch next to power supply to ON. Test that all control functions are operable.
18. Once control is functioning properly, reinsert control assembly into machine. Fasten to front panel with screws removed previously.

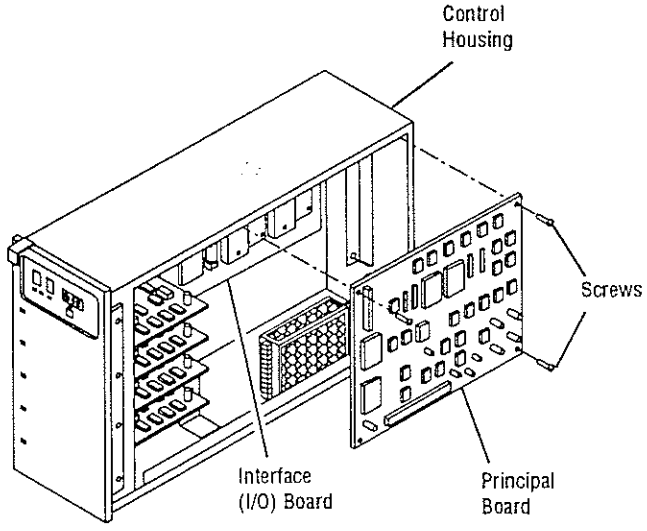


Figure 7-7. Remove Principal Board

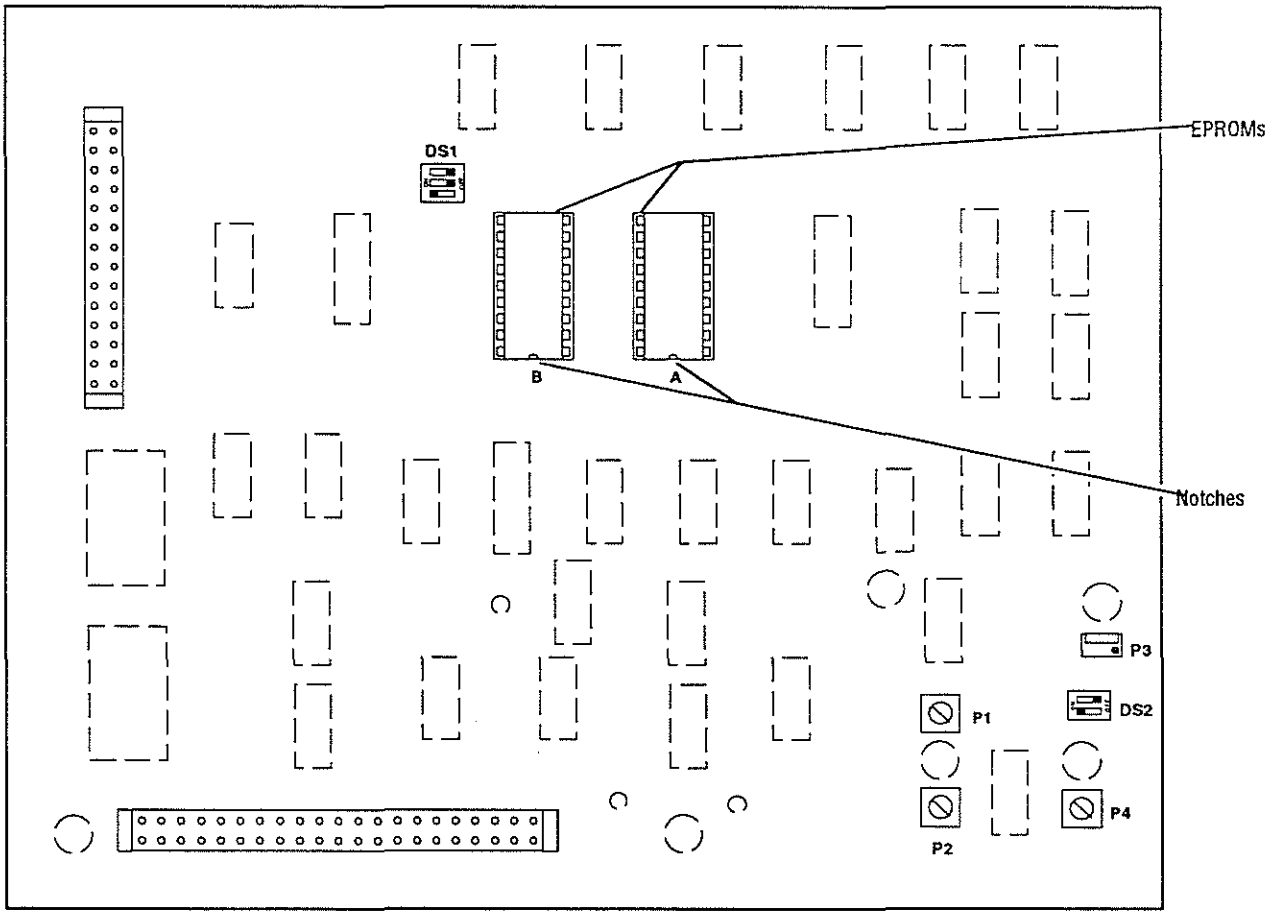


Figure 7-8. Principal PC Board

7.2.6 Principal PC Board Replacement

CAUTION:

- **Observe the Electrostatic Precautions outlined in Section 7.2.1. Always wear a grounding wrist strap when removing or replacing PC boards.**

NOTE: Before replacing principal PC board (P/N 117950-295 or P/N 117950-607), run a WASH ONLY cycle and time detergent injection (amount of time detergent pump runs). Make a note of the time so that pot P3 on new board can be adjusted accordingly.

1. Position toggle switch next to power supply to OFF.
2. Remove three screws holding principal PC board to control housing (see Figure 7-7).
3. Remove wire plugs (note position for reattachment).
4. Lift defective board out of control housing.
5. Remove EPROMs (see Figure 7-8) from defective board.

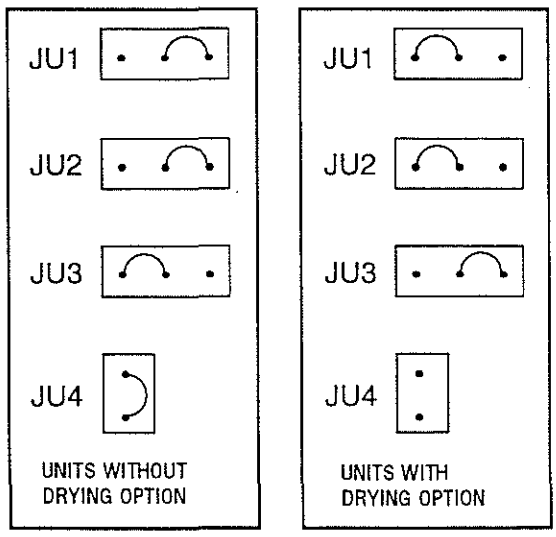


Figure 7-9. Check Jumper Settings

Table 7-9. DS1 Settings—Principal Board

MODEL	2-SWITCH DIP SWITCH*		3-SWITCH DIP SWITCH*			BOARD PART NUMBER	EPROM VERSION
	#1	#2	#1	#2	#3		
w/o Drying	0	I	0	0	I	117950-295	A-B
w/o Drying**	0	0	0	0	0	117950-295	A-B
with Drying	0	0	0	0	0	117950-607	A1-B1

0 = OFF
I = ON

* *On some older boards DS1 is a two-position dip switch. The new board will have a three-position dip switch. When setting dip switch DS1 on new board, set positions #1 and #3 like positions #1 and #2 of old board. Set position #2 to OFF.*

** *With Vapor Removal phase selector located in place of Steam Injection phase selector on units without steam injection.*

Table 7-10. DS2 Settings—Principal Board

SWITCH		DETERGENT INJECTION
#1	#2*	
I	N/A	ON
0	N/A	OFF

0 = OFF
I = ON

* *Position #2 is not connected.*

NOTE: There are four jumpers on this board. Before replacing old board with new board, check that jumpers on new board are the same as on old board. See Figure 7-9. The correct part number should give you the right jumpers.

6. Check new board. Make sure jumpers 1, 2, 3 and 4 are set as indicated in Figure 7-9.

NOTE: The principal board (see Figure 7-8) contains two dip switches, DS1 and DS2. The DS1 setting, along with the two EPROMs, identify to the control the model of washer. DS2 governs whether detergent injection during wash phase is ON or OFF. See Tables 7-9 and 7-10 for dip switch settings.

7. Set dip switches DS1 and DS2 (see Figure 7-8) to match settings on old board.

NOTE: Some older boards may have only two switches on DS1. If this is the case, then set switch #1 on new board to match #1 on old board and switch #3 on new board to match #2 on old board. Set switch #2 on new board to OFF.

8. Attach EPROMs from old board to new board. Make sure that EPROM "B" is in "B" position and "A" is in "A" position (see Figure 7-8). Notch on EPROM should point down (over letter "A" or "B").
9. Replace wire plugs, making sure they are in same orientation as before.
10. Attach new board to control housing (three screws).
11. Position toggle switch next to power supply to ON.
12. **Adjust pots** (see Figure 7-8) on new board as follows:
    a. P3—Detergent pump timer. Run a WASH ONLY cycle and time detergent pump. Adjust P3 so that timer runs for amount of time determined by WASH cycle run at beginning of procedure. Turn pot clockwise to increase time; counterclockwise to decrease.

NOTE: Depending on detergent used and actual soil conditions, detergent injection time is approximately 13 seconds (for model 120) or 15 seconds (for model 220). At 1 oz per second, this gives 13 ±2 oz (355 ±59 ml) of detergent for model 120 and 15 ±2 oz (444 ±59 ml) of detergent for model 220.

    b. P4—Drain. Run PRE-WASH ONLY cycle and time draining at end of phase. Drain time should be 35 -0, +10 seconds (for model 120) or 45 -0, +10 seconds (for model 220). Turn pot clockwise to increase time; counterclockwise to decrease.

NOTE: The P1 pot adjustment is opposite the others. Counterclockwise increases; clockwise decreases.

    c. P1 (only on model 120/220 washers with vapor removal)—On units with vapor removal, sets time delay before fan starts for steam injection phase—30 seconds. Adjust accordingly, turning counterclockwise to increase delay; clockwise to decrease delay.
13. After making pot adjustments, run a test cycle and check that control is functioning properly.
14. Once control is functioning properly, reinsert control assembly into machine. Fasten to front panel with screws removed previously.

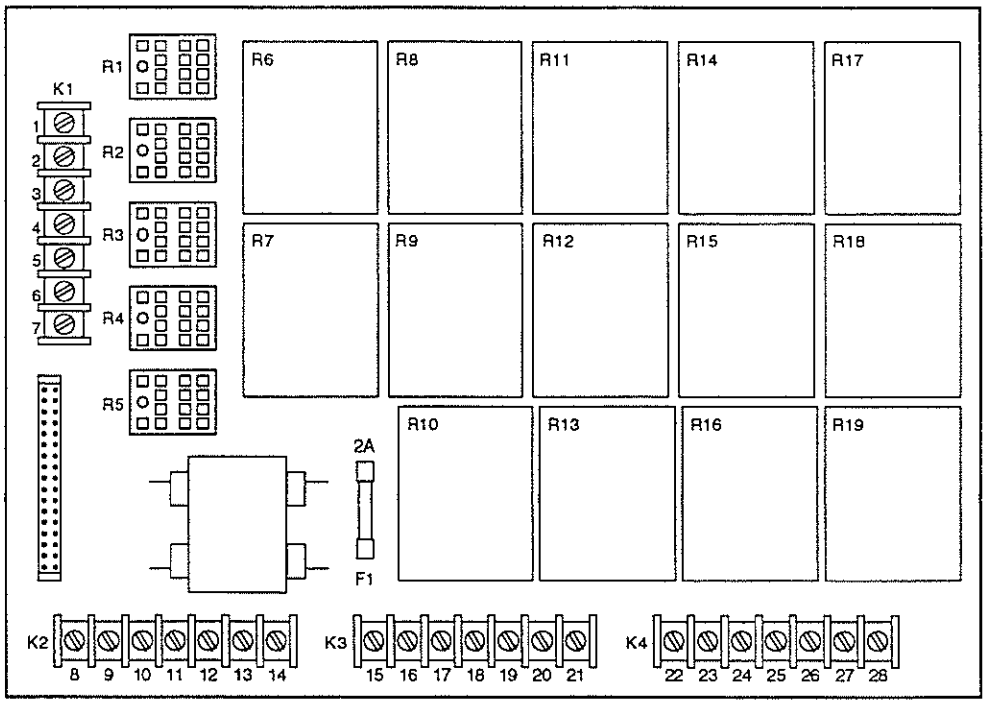


Figure 7-10. Interface (I/O) Board

7.2.7 Interface (I/O) Board Repair/Replacement

CAUTION:

- **Observe the Electrostatic Precautions outlined in Section 7.2.1. Always wear a grounding wrist strap when removing or replacing PC boards.**

This board seldom needs to be replaced. With use of the schematic, trouble can usually be traced to one of the solid-state relays or one of the electro-mechanical relays. Relays can be tested by unplugging the suspect relay and switching it with a functioning relay, then testing the operation again. If relay does not function in new location, then relay is defective and should be replaced.

1. To troubleshoot the interface (I/O) board, proceed as follows:
   a. Position main power supply to OFF.
   b. Remove three screws holding principal PC board to control housing. Lift principal PC board out of the way.
   c. On the I/O PC board (see Figure 7-10), switch the relay for the function that is not working with one that is working.
   d. Position main power supply to ON. Test the function for the relay being checked.

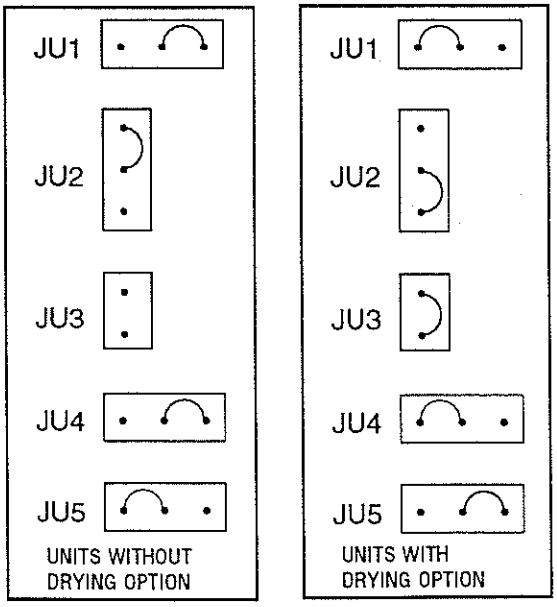


Figure 7-11. Check Jumper Settings

NOTE: To check if relay is being energized, use a test light to check voltage across pin for that relay to pin K2-14 (ground). Voltage should be 110 V. ***Do not use a voltmeter to check****. Relays have a current leak voltage, even when relay is not energized. This leakage will register on a voltmeter but will not light a test light.*

e. If relay does not function in new position, then relay is faulty. Position main power supply to OFF and replace resistor.

f. Position main power supply to ON and test function again with new resistor in place.

g. Once all functions are operating properly, replace principal PC board and fasten in place with three screws removed previously.

h. Reinsert control assembly into machine. Fasten to front panel with screws removed previously.

2. If necessary to replace interface (I/O) board, proceed as follows:

NOTE: There are five jumpers on this board. Before replacing old board with new board, check that jumpers on new board are the same as on old board. See Figure 7-11. The correct part number should give you the right jumpers.

a. Position main power supply to OFF.

b. Remove three screws holding principal PC board to control housing. Lift principal PC board out of the way.

c. Remove all wiring from I/O board (making note of wire positions for reattachment).

d. Remove four screws holding I/O board to control housing and remove board.

e. Unplug relays from old board and plug them into new board.

f. Attach new I/O board to control housing.

g. Make all wire connections, being careful to replace wires in proper position. If in doubt, refer to wiring diagram for proper connections.

h. Position main power supply to ON and test all control functions.

i. Once all functions are operating properly, replace principal PC board and fasten in place with three screws removed previously.

j. Reinsert control assembly into machine. Fasten to front panel with screws removed previously.

⚠ WARNING: ELECTRIC SHOCK AND/OR BURN HAZARD

- **Lock building electrical supply disconnect switch to OFF, close unit supply valves, and position power switch to OFF before performing any service on the unit. When power switch is ON, door switch(es) and valves are energized, and if cycle is started hot water/steam would enter piping.**

7.3 DOOR(S)

7.3.1 Microswitch Replacement and Adjustment (See Figures 8-2 and 8-3)

- **Replacement**

1. Lock electrical disconnect switch to OFF, position power switch to OFF and close unit supply valves.
2. Remove screws holding door microswitch box cover in place (two on Model 120, four on Model 220).
3. Remove cover from microswitch mounting bracket(s).

NOTE: Make note of electrical connections for reassembly.

4. Disconnect all electrical wiring from faulty micro-switch.
5. Remove two mounting bolts and nuts holding microswitch to mounting bracket.
6. Using bolts and nuts previously removed, securely fasten new microswitch to mounting bracket. Make sure roller on switch lever faces toward the washer so that it is accessible through cutout in box cover.
7. Reconnect wiring to switch.
8. Replace microswitch box cover. Check that roller on switch lever comes through cutout in box cover.
9. Unlock building electrical supply disconnect switch and set to ON. Open unit supply valves and turn power switch to ON. When READY light comes on, press START to run a cycle.

⚠ WARNING: BURN HAZARD

- **Wear gloves and face protection and open door slowly if it is necessary to open door during a cycle. Hot water/steam may be sprayed through door opening when checking automatic stop while washer is operating.**

10. Check operation of door microswitch by opening door during the cycle. If washer operation is not stopped when door is opened, press STOP and adjust door microswitch.

- Adjustment

1. Lock electrical disconnect switch to OFF, position power switch to OFF and close unit supply valves.
2. Remove screws holding door microswitch box cover in place (two on Model 120, four on Model 220).
3. Remove cover from microswitch mounting bracket(s).
4. Adjust microswitch by slightly bending switch lever.
5. Replace microswitch box cover. Check that roller on switch lever comes through cutout in box cover.
6. Unlock building electrical supply disconnect switch and set to ON. Open unit supply valves and turn power switch to ON. When READY light comes on, press START to run a cycle.

⚠ WARNING: BURN HAZARD

- **Wear gloves and face protection and open door slowly if it is necessary to open door during a cycle. Hot water/steam may be sprayed through door opening when checking automatic stop while washer is operating.**

7. Check operation of door microswitch by opening door during the cycle. If washer operation is not stopped when door is opened, press STOP and repeat the above steps until microswitch is properly adjusted.

7.3.2 Window and Window Gasket Replacement (Figure 7-12)

1. Position power switch to OFF.
2. Remove window and gasket as follows:
   a. Open chamber door. Locate end of seal wedge in window gasket on inside of door.
   b. Pry end of wedge out of gasket groove. Pull on loose end of seal wedge to remove wedge from gasket groove.
   c. Pull inside lip of gasket away from window glass and carefully remove glass.
   d. Remove and discard used gasket.
3. Install new gasket around window opening in door.

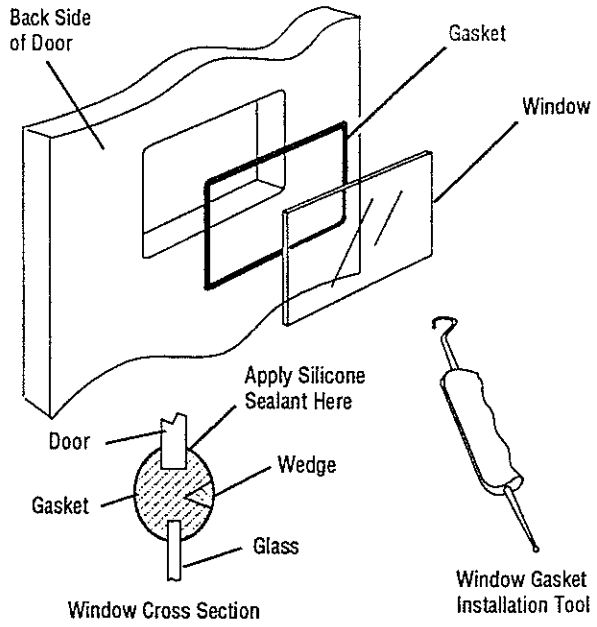


Figure 7-12. Door Window Replacement

4. Starting in lower corner, place new window glass into gasket groove. Work glass into place along lower edge first, then up both sides, and then along top edge of gasket. Make sure window is securely fitted into gasket groove.
5. Using window gasket installation tool (P/N 117950-035), pry open the groove in the gasket and place one end of the wedge into the groove.
6. Slowly pull installation tool along gasket while pushing wedge into groove behind the tool. Continue around the entire window.
7. Check that gasket, window and wedge are securely in place. Apply, on inside of door only, a thin layer of silicone sealant over joint between gasket and door.
8. Close door and position power switch to ON. When READY light comes on, press START to run a cycle. Check that gasket does not leak.

⚠ WARNING: ELECTRIC SHOCK AND/OR BURN HAZARD

- **Lock building electrical supply disconnect switch to OFF, close unit supply valves, and position power switch to OFF before performing any service on the unit. When power switch is ON valves are energized, and if cycle is started hot water/steam would enter piping.**

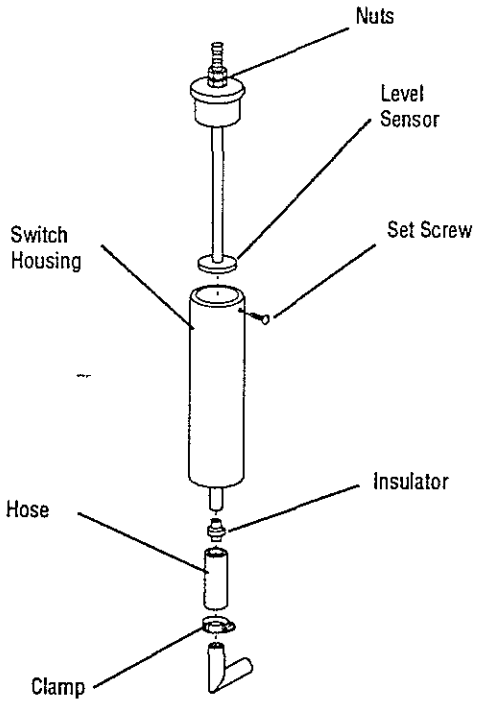


Figure 7-13. Water Level Switch

⚠ WARNING: FALL HAZARD

- **To prevent falls, keep floors dry. Promptly clean up any spills or drippage.**

7.4 WASH CHAMBER

7.4.1 Water Level Switch Adjustment

To raise or lower wash chamber water level limit, adjust the water level switch as follows:

1. Lock electrical disconnect switch to OFF, position power switch to OFF and close unit supply valves.
2. Open service side access doors (if installed).
3. Locate chamber water level control switch (see Figure 8-12).
4. Remove set screw from side of switch housing. Pull level sensor assembly up and out of housing (see Figure 7-13).
5. Loosen the two nuts on top of switch assembly. Screw level sensor up into cap to raise water level limit, or unscrew and lower sensor away from cap to lower water level limit. Tighten nuts to hold sensor in desired position.

NOTE: Water level in wash chamber must be set at 3" over chamber filters.

6. Replace level sensor assembly in switch housing. Replace and tighten set screw.
7. Unlock building electrical supply disconnect switch and set to ON. Open unit supply valves and turn power switch to ON. When READY light comes on, press START to run a cycle. Check that chamber water is at desired level.

7.4.2 Water Level Switch Insulator Replacement

1. Lock electrical disconnect switch to OFF, position power switch to OFF and close unit supply valves.
2. Open service side access doors (if installed).
3. Locate chamber water level control switch (see Figure 8-12).

NOTE: Connection is tight between insulator and housing. Pliers may be needed to remove insulator from bottom of switch housing.

4. Remove clamps and disconnect hose from bottom of switch housing (see Figure 7-13).
5. Push new insulator into bottom of housing. Connect hose to housing and attach clamps.
6. Unlock building electrical supply disconnect switch and set to ON. Open unit supply valves and turn power switch to ON. When READY light comes on, press START to run a cycle. Check water level switch for leaks.

⚠ WARNING: ELECTRIC SHOCK AND/OR BURN HAZARD

- **Lock building electrical supply disconnect switch to OFF, close unit supply valves, and position power switch to OFF before performing any service on the unit. When power switch is ON valves are energized, and if cycle is started hot water/steam would enter piping.**

7.5 DETERGENT (OR RINSE AGENT) INJECTION PUMP (FIGURES 7-14 AND 8-7)

7.5.1 Roller Block Assembly Replacement

The roller block assembly, including roller block and head kit, should be replaced whenever the block shows signs of wear. A worn roller block assembly may greatly reduce pump flow.

1. Lock electrical disconnect switch to OFF, position power switch to OFF and open service side access doors, if installed.

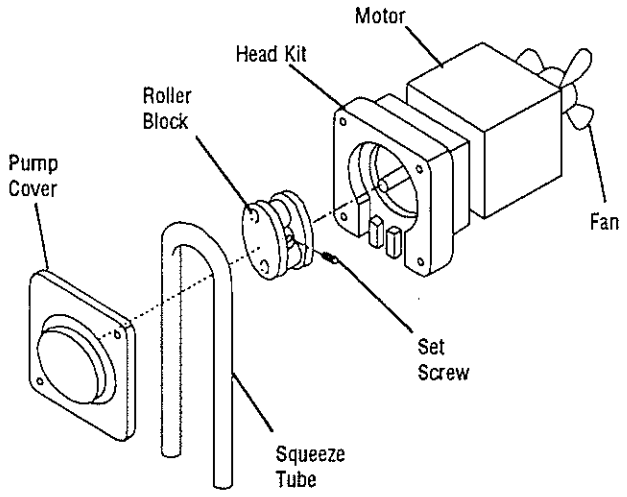


Figure 7-14. Detergent/Rinse Agent Pump

⚠ WARNING: CHEMICAL BURN/EYE INJURY HAZARD

- **Wear gloves and eye protection when removing clamps and replacing squeeze tube. Residual detergent/rinse agent might remain in used squeeze tube. If detergent contacts skin or eyes, immediately flush with running water for at least 10 minutes. If contact was with the eyes, seek medical attention.**

2. Remove pickup line from detergent (or rinse agent) container.
3. Place a small container under squeeze tube/pickup line connection. Separate squeeze tube from pickup line.
4. Remove clamps and disconnect other end of squeeze tube from chamber feed line.
5. Remove two screws attaching pump cover to pump head kit. Lift cover away from pump head kit.
6. Pulling on one end of squeeze tube, pull tube out of pump head kit.
7. Using an Allen hex key, remove set screw holding roller block to head kit. Lift roller block out of head kit.
8. Remove two screws holding head kit in place. Pull head kit away from pump motor.
9. Clean all pump surfaces.
10. Attach new head kit to motor.

⚠ CAUTION:

- **Carefully tighten set screw. The metal set screw can easily strip the plastic threads in the roller block assembly.**

11. Place new roller block into head kit and carefully tighten set screw using an Allen hex key.
12. Connect squeeze tube to pickup line.
13. Insert end of squeeze tube into pump head. Feed tube through pump head by manually rotating roller block.
14. Liberally spread silicone lubricant over rollers in roller block and all tubing surfaces in contact with the pump head kit.
15. Replace pump cover and fasten with screws removed previously.
16. Connect squeeze tube to chamber feed line and attach clamps.
17. Unlock building electrical supply disconnect switch and set to ON. Turn power switch to ON and operate prime switch to fill tubing with detergent (or rinse agent).

7.5.2 Detergent/Rinse Agent Pump Motor Replacement

1. Lock electrical disconnect switch to OFF, position power switch to OFF and open service side access doors, if installed.

⚠ WARNING: CHEMICAL BURN/EYE INJURY HAZARD

- **Wear gloves and eye protection when removing clamps and replacing squeeze tube. Residual detergent/rinse agent might remain in used squeeze tube. If detergent contacts skin or eyes, immediately flush with running water for at least 10 minutes. If contact was with the eyes, seek medical attention.**

2. Place a small container under squeeze tube/pickup line connection. Separate squeeze tube from pickup line.
3. Remove clamps and disconnect other end of squeeze tube from chamber feed line.
4. Remove two screws attaching pump cover to pump head kit. Lift cover away from pump head kit.
5. Pulling on one end of squeeze tube, pull tube out of pump head kit.
6. Using an Allen hex key, remove set screw holding roller block to head kit. Lift roller block out of head kit.

7. Remove two screws holding head kit in place. Pull head kit away from pump motor.

NOTE: Make note of electrical connections for re-assembly.

8. Disconnect all electrical connections from motor.

⚠ CAUTION:

- **Make sure a cooling fan is attached to rear motor shaft on new motor. Check that fan blades are positioned to send airflow to motor. Motor will overheat without a cooling fan.**

9. Install new motor. Make all wiring connections.
10. Attach head kit to new motor, using screws previously removed.
11. Clean all pump surfaces.

⚠ CAUTION:

- **Carefully tighten set screw. The metal set screw can easily strip the plastic threads in the roller block assembly.**

12. Place roller block into head kit and carefully tighten set screw using an Allen hex key.
13. Connect squeeze tube to pickup line.
14. Insert end of squeeze tube into pump head. Feed tube through pump head by manually rotating roller block.
15. Liberally spread silicone lubricant over rollers in roller block and all tubing surfaces in contact with the pump head kit.
16. Replace pump cover and fasten with screws removed previously.
17. Connect squeeze tube to chamber feed line and attach clamps.
18. Unlock building electrical supply disconnect switch and set to ON. Turn power switch to ON and operate prime switch to fill tubing with detergent (or rinse agent).

⚠ WARNING: PERSONAL INJURY HAZARD

- **Lock building electrical supply disconnect switch to OFF and position power switch to OFF before performing any service on traveller assembly. When power is ON, motor can be started and chain drive movement could lead to injury.**

7.6 TRAVELLING SPRAY MANIFOLD FRICTION CLUTCH ADJUSTMENT (Figure 8-10)

The travelling spray manifold friction clutch is mounted along the service side of the unit (see Figure 8-1).

1. Lock electrical disconnect switch to OFF, position power switch to OFF and open service side access doors, if installed.
2. Remove clutch and sprocket assembly from gear box.
3. Clamp sprocket in bench vise (see Figure 7-15).

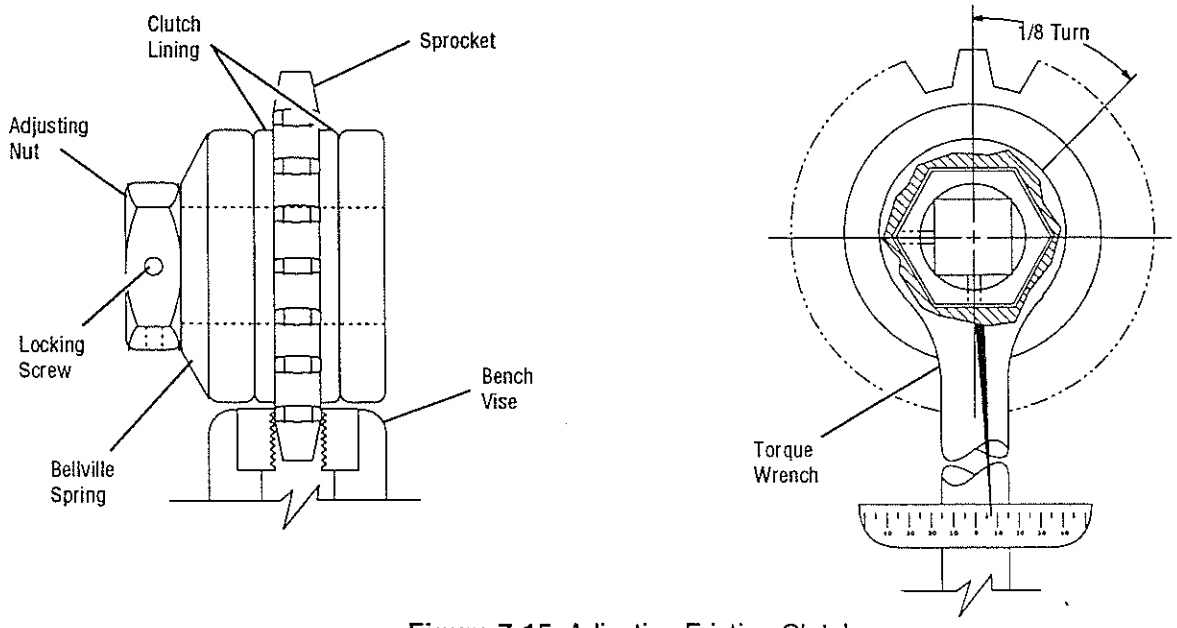


Figure 7-15. Adjusting Friction Clutch

4. Loosen two locking screws holding torque adjusting nut in place.
5. Loosen torque adjusting nut.
6. Tighten torque adjusting nut **by hand** until nut is flush against bellville spring.
7. Using torque wrench, tight nut approximately **1/8** turn. Tighten locking screws to lock nut in place.
8. Apply torque wrench to nut and check torque needed to make clutch slip against sprocket. It should be 6 to 8 ft-lb (8.15 to 10.85 Nm). This torque is equivalent to a 45 lb (200 N) tension force on the traveller cable.
9. Reinstall clutch and sprocket assembly in gear box.

⚠ WARNING: ELECTRIC SHOCK AND/OR BURN HAZARD

- **Lock building electrical supply disconnect switch to OFF, close unit supply valves, and position power switch to OFF before performing any service on the unit. When power switch is ON valves are energized, and if cycle is started hot water/steam would enter piping.**

⚠ WARNING: BURN HAZARD

- **Allow unit to cool down before performing any service on pump. Surface of motor and piping become very hot during unit operation.**

⚠ WARNING: FALL HAZARD

- **To prevent falls, keep floors dry. Promptly clean up any spills or drippage.**

7.7 RECIRCULATING PUMP (Figure 8-13)

The recirculating pump is mounted along the service side of the unit (see Figures 8-1 and 8-12).

7.7.1 Pump Replacement

1. Lock electrical disconnect switch to OFF, position power switch to OFF and close unit supply valves.

NOTE: Remove entire pump assembly only if replacing pump motor.

2. Open service side access doors (if installed).
3. Remove clamps and disconnect all hose ends from pump assembly.

NOTE: Make note of electrical connections for reassembly.

4. Disconnect all electrical connections to the pump.
5. Remove mounting bolts holding pump assembly to unit frame, and remove pump assembly from washer.
6. Place new pump in washer and mount to unit frame using bolts removed previously.
7. Connect all wiring.
8. Connect hoses to pump assembly and attach clamps.
9. Unlock building electrical supply disconnect switch and set to ON. Open unit supply valves and turn power switch to ON. When READY light comes on, press START to run a cycle. Check that pump is rotating in proper direction (see arrow on pump). Check piping connections for leaks.

7.7.2 O-Ring Replacement

1. Lock electrical disconnect switch to OFF, position power switch to OFF and close unit supply valves.
2. Remove front access panel, below main control panel.
3. Remove bolts fastening pump cradle to unit frame (see Figure 7-16).
4. Tilt pump cradle up to gain access to pump (see arrows in Figure 7-16).
5. Release the four clips holding pump cover to pump assembly. Lift cover away from assembly.
6. Remove worn O-ring from inside of pump cover and insert new O-ring.
7. Place pump cover on pump assembly and fasten clips.
8. Pivot pump cradle down and fasten to unit frame with bolts removed previously.
9. Unlock building electrical supply disconnect switch and set to ON. Open unit supply valves and turn power switch to ON. When READY light comes on, press START to run a cycle. Check that pump is rotating in proper direction (see arrow on pump). Check pump cover and piping connections for leaks.

7.7.3 Seal Replacement

1. Lock electrical disconnect switch to OFF, position power switch to OFF and close unit supply valves.
2. Remove front access panel, below main control panel.

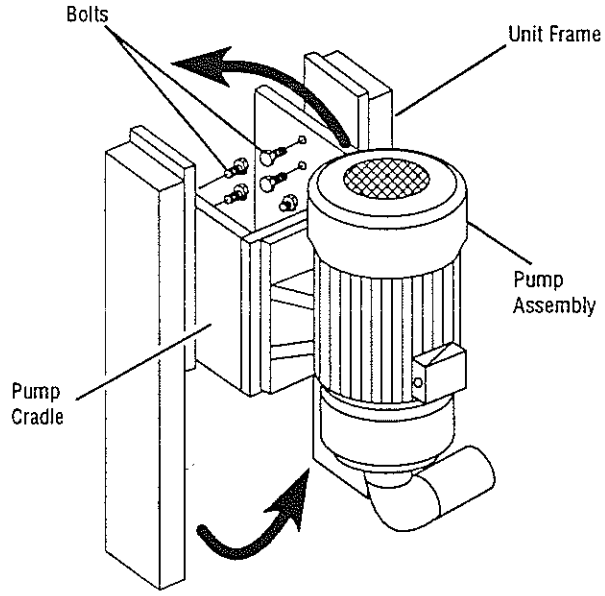


Figure 7-16. Tilt Pump Cradle

3. Remove bolts fastening pump cradle to unit frame (see Figure 7-16).
4. Tilt pump cradle up to gain access to pump (see arrows in Figure 7-16).
5. Release the four clips holding pump cover to pump assembly. Lift cover away from assembly.
6. Remove nut and washer from shaft. Lift squirrel cage, washer and sealing flange from shaft.
7. Remove worn seals from shaft and replace with new seals.
8. Return sealing flange, washer and squirrel cage to shaft. Reinstall washer and nut on shaft. Tighten nut to hold assembly in place.
9. Place pump cover on pump assembly and fasten clips.
10. Pivot pump cradle down and fasten to unit frame with bolts removed previously.
11. Unlock building electrical supply disconnect switch and set to ON. Open unit supply valves and turn power switch to ON. When READY light comes on, press START to run a cycle. Check that pump is rotating in proper direction (see arrow on pump). Check pump assembly and piping connections for leaks.

7.8 VALVES

A solenoid valve is a combination of two basic functional units: 1) a solenoid (electromagnet) with its pivot arm (plunger), and 2) a valve containing an orifice in which a seal or plug is positioned to stop or allow flow. The valve is opened or closed by movement of the magnetic pivot arm (plunger) which is drawn into the solenoid when the coil is energized. The solenoid is mounted directly on the valve housing.

NOTE: When installing new valves in any line, note the arrow stamped on the valve body or the words "IN" and "OUT" stamped at the inlet and outlet ports. A reversed valve cannot operate properly.

⚠ WARNING: ELECTRIC SHOCK AND/OR BURN HAZARD

- **Lock building electrical supply disconnect switch to OFF, close unit supply valves, and position power switch to OFF before performing any service on the unit. When power switch is ON valves are energized, and if cycle is started hot water/steam would enter piping.**

⚠ WARNING: BURN HAZARD

- **Allow unit to cool down before performing any service on pump. Piping and valves become very hot during unit operation.**

⚠ WARNING: FALL HAZARD

- **To prevent falls, keep floors dry. Promptly clean up any spills or drippage.**

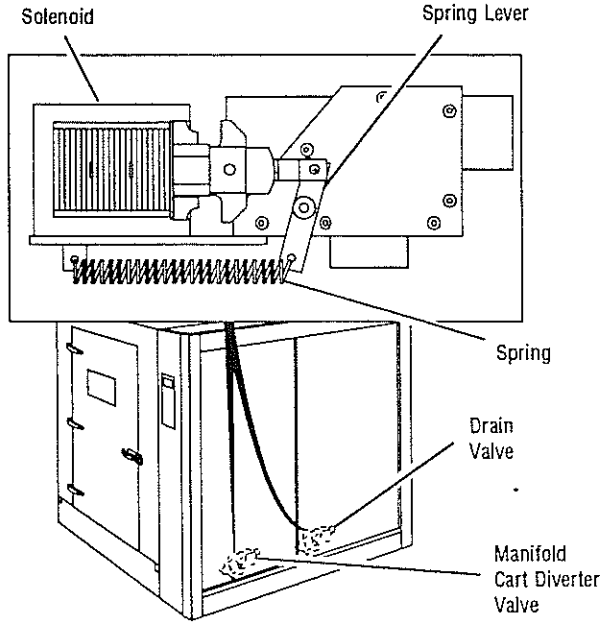


Figure 7-17. Diverter Valves

7.8.1 Diverter Drain Valve (Figure 8-15)

The diverter drain valve is on the service side of washer (see Figure 7-17). If unit is equipped with optional manifold cart coupling system, there is a second drain valve. Procedures are the same for both.

SPRING REPLACEMENT

The solenoid spring may break due to metal fatigue. Replace spring as follows:

1. Lock electrical disconnect switch to OFF, position power switch to OFF and close unit supply valves.
2. Open service side access doors (if installed).
3. Unhook spring from bottom of valve housing and from spring lever (see Figure 7-17).
4. Hook one end of new spring into spring lever and the other end into tab on bottom of valve housing.
5. Unlock building electrical supply disconnect switch and set to ON. Turn power switch to ON.
6. Check valve operation. If solenoid "hums," stretch spring to reduce the tension. If solenoid continues to "hum," check alignment of solenoid; adjust as necessary.

SOLENOID ASSEMBLY ADJUSTMENT AND REPLACEMENT

- **Adjustment**

Solenoid assembly may be misaligned due to the pivot arm assembly hitting the solenoid frame. Adjust the solenoid assembly as follows:

1. Lock electrical disconnect switch to OFF, position power switch to OFF and close unit supply valves.
2. Open service side access doors (if installed).
3. Remove clamps and disconnect hose ends from drain valve inlet and outlet.

NOTE: Make note of electrical connections for reassembly.

4. Disconnect all electrical wiring from the valve.
5. Disconnect union on drain line. Carefully lift valve out of unit.
6. Loosen nuts on the four hex-head bolts securing solenoid assembly to valve housing.
7. Move solenoid assembly (usually forward) along slots in solenoid base. Valve stroke is 3/4" ± 1/16".

NOTE: Solenoid assembly is correctly positioned when assembly and pivot arm are aligned in the same axis and end of pivot arm is tight against solenoid when valve is open.

8. When assembly is correctly adjusted, tighten nuts.
9. Carefully return valve assembly to unit.
10. Connect union on drain line and reconnect all wiring.
11. Connect hose ends to drain valve inlet and outlet, and attach clamps.
12. Unlock building electrical supply disconnect switch and set to ON. Turn power switch to ON.
13. Check valve operation.

- **Replacement**

Replace solenoid assembly if it is short-circuited, if winding is open, if solenoid changes color (is getting too hot), or if solenoid is burned out. Replace solenoid assembly as follows:

1. Lock electrical disconnect switch to OFF, position power switch to OFF and close unit supply valves.
2. Open service side access doors (if installed).
3. Remove clamps and disconnect hose ends from drain valve inlet and outlet.

NOTE: Make note of electrical connections for reassembly.

4. Disconnect all electrical wiring from the valve.
5. Disconnect union on drain line. Carefully lift valve out of unit.
6. Remove two screws holding solenoid cover to valve housing. Remove solenoid cover.
7. Remove cotter pin and solenoid pin from connecting link.
8. Remove four hex-head bolts, nuts and washers attaching solenoid assembly to valve housing. Remove solenoid assembly from valve housing.
9. Place new solenoid assembly on valve housing and loosely fasten with hex-head bolts, washers and nuts removed previously.
10. Insert solenoid pin through connecting link and solenoid assembly. Lock in place with cotter pin.
11. Move solenoid assembly (usually forward) along slots in solenoid base. Valve stroke is 3/4" ±1/16".

NOTE: Solenoid assembly is correctly positioned when assembly and pivot arm are aligned in the same axis and end of pivot arm is tight against solenoid when valve is open.

12. When assembly is correctly adjusted, tighten nuts. Check that solenoid assembly is securely attached to valve housing.
13. Place solenoid cover over solenoid and fasten in place with screws removed previously.
14. Carefully return valve assembly to unit.
15. Connect union on drain line and reconnect all wiring.
16. Connect hose ends to drain valve inlet and outlet, and attach clamps.
17. Unlock building electrical supply disconnect switch and set to ON. Turn power switch to ON.
18. Check valve operation. If solenoid "hums," check alignment of solenoid and adjust as necessary.

SEAL REPLACEMENT

If water flows through the seal when valve is closed, replace valve seal as follows:

1. Lock electrical disconnect switch to OFF, position power switch to OFF and close unit supply valves.
2. Open service side access doors (if installed).
3. Remove clamps and disconnect hose ends from drain valve inlet and outlet.

NOTE: Make note of electrical connections for reassembly.

4. Disconnect all electrical wiring from the valve.
5. Disconnect union on drain line. Carefully lift valve out of unit.
6. Remove two screws holding solenoid cover to valve housing. Remove solenoid cover.
7. Unhook end of spring from tab on bottom of valve housing. Remove set screw and spring pin from spring lever, and pull lever away from end of pivot arm assembly.
8. Remove four hex-head bolts, nuts and washers attaching solenoid assembly to valve housing. Remove solenoid assembly from valve housing.
9. Remove two set screws securing packing nut to valve housing cover. Remove packing nut, washer and O-rings.
10. Remove screws holding valve housing cover in place. Lift cover and gasket off of valve housing.
11. Carefully remove pivot arm assembly from valve housing. Remove nuts, washer and seal from pivot arm assembly.
12. Place new seal on assembly. Fasten seal to pivot arm assembly with washer and nuts previously removed.
13. Insert pivot arm assembly into valve housing. Attach valve gasket and cover to valve housing.
14. Return O-rings, washer and packing nut to valve cover. Secure packing nut with set screws.
15. Place solenoid assembly on valve housing and loosely fasten with hex-head bolts, washers and nuts removed previously.
16. Place spring lever over end of pivot arm assembly and fasten with spring pin and set screw.
17. Hook end of spring into tab on bottom of valve housing.
18. Move solenoid assembly (usually forward) along slots in solenoid base. Valve stroke is $3/4" \pm 1/16"$.

NOTE: Solenoid assembly is correctly positioned when assembly and pivot arm are aligned in the same axis and end of pivot arm is tight against solenoid when valve is open.

19. When assembly is correctly adjusted, tighten nuts. Check that solenoid assembly is securely attached to valve housing.
20. Place solenoid cover over solenoid and fasten in place with screws removed previously.
21. Carefully return valve assembly to unit.
22. Connect union on drain line and reconnect all wiring.
23. Connect hose ends to drain valve inlet and outlet, and attach clamps.
24. Unlock building electrical supply disconnect switch and set to ON. Turn power switch to ON.
25. Check valve operation. If solenoid "hums," check alignment of solenoid and adjust as necessary.

⚠ WARNING: ELECTRIC SHOCK AND/OR BURN HAZARD

- **Lock building electrical supply disconnect switch to OFF, close unit supply valves, and position power switch to OFF before performing any service on the unit. When power switch is ON valves are energized, and if cycle is started hot water/steam would enter piping.**

⚠ WARNING: BURN HAZARD

- **Allow unit to cool down before performing any service on pump. Piping and valves become very hot during unit operation.**

⚠ WARNING: FALL HAZARD

- **To prevent falls, keep floors dry. Promptly clean up any spills or drippage.**

7.8.2 2-1/2" Solenoid Valve (Units with Optional Water Temperature Booster Tank—Figure 8-16)

If unit is equipped with water temperature booster, the 2-1/2" solenoid transfer valve is located underneath the water tank (see Figures 7-18 and 8-14).

SPRING REPLACEMENT

The solenoid spring may break due to metal fatigue. Replace spring as follows:

1. Lock electrical disconnect switch to OFF, position power switch to OFF and close unit supply valves.
2. Open service side access doors (if installed).
3. Remove clamps and disconnect hose ends from valve inlet and outlet.

NOTE: Make note of electrical connections for reassembly.

4. Disconnect all electrical wiring from solenoid.
5. Carefully lift solenoid valve out of unit.
6. Remove nut and washer holding spring sleeve in place.
7. Remove spring sleeve and unhook spring from spring lever pin.
8. Hook new spring into groove on spring lever pin. Insert spring sleeve through spring and valve housing.

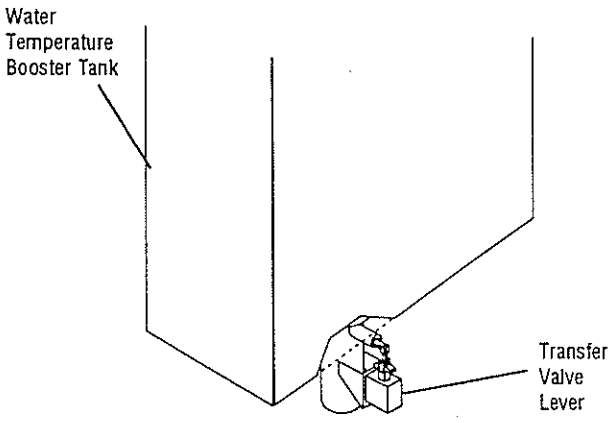


Figure 7-18. 2-1/2" Solenoid Valve

9. Securely fasten spring sleeve in place with nut and washer previously removed.
10. Carefully return valve to unit and reconnect all wiring.
11. Connect hose ends to valve inlet and outlet and attach clamps.
12. Unlock building electrical supply disconnect switch and set to ON. Turn power switch to ON.
13. Check valve operation. If solenoid "hums," stretch spring to reduce the tension. If solenoid continues to "hum," check alignment of solenoid and adjust as necessary.

SOLENOID ASSEMBLY ADJUSTMENT AND REPLACEMENT

- **Adjustment**

Solenoid assembly may be misaligned due to the pivot arm assembly hitting the solenoid frame. Adjust the solenoid assembly as follows:

1. Lock electrical disconnect switch to OFF, position power switch to OFF and close unit supply valves.
2. Open service side access doors (if installed).
3. Remove clamps and disconnect hose ends from valve inlet and outlet.

NOTE: Make note of electrical connections for reassembly.

4. Disconnect all electrical wiring from the valve.
5. Carefully lift valve out of unit.
6. Loosen nuts on the four hex-head bolts securing solenoid assembly to valve housing.
7. Move solenoid assembly (usually forward) along slots in solenoid base. Valve stroke is 5/8" ±1/16".

NOTE: Solenoid assembly is correctly positioned when assembly and pivot arm are aligned in the same axis and end of pivot arm is tight against solenoid when valve is open.

8. When assembly is correctly adjusted, tighten nuts.
9. Carefully return valve assembly to unit and reconnect all wiring.
10. Connect hose ends to valve inlet and outlet, and attach clamps.
11. Unlock building electrical supply disconnect switch and set to ON. Turn power switch to ON.
12. Check valve operation.

- Replacement

Replace solenoid assembly if it is short-circuited, if winding is open, if solenoid changes color (is getting too hot), or if solenoid is burned out. Replace solenoid assembly as follows:

1. Lock electrical disconnect switch to OFF, position power switch to OFF and close unit supply valves.
2. Open service side access doors (if installed).
3. Remove clamps and disconnect hose ends from valve inlet and outlet.

NOTE: Make note of electrical connections for reassembly.

4. Disconnect all electrical wiring from the valve.
5. Carefully lift valve out of unit.
6. Remove cotter pin from solenoid pin. Remove solenoid pin and spacers from connecting link.
7. Remove four hex-head bolts, nuts and washers attaching solenoid assembly to valve housing. Remove solenoid assembly from valve housing.
8. Place new solenoid assembly on valve housing and loosely fasten with hex-head bolts, washers and nuts removed previously.
9. Insert solenoid pin through solenoid assembly, spacers and connecting link. Make sure spacers are inserted between solenoid assembly and connecting link. Lock solenoid pin in place with cotter pin.
10. Move solenoid assembly (usually forward) along slots in solenoid base. Valve stroke is 5/8" ± 1/16".

NOTE: Solenoid assembly is correctly positioned when assembly and pivot arm are aligned in the same axis and end of pivot arm is tight against solenoid when valve is open.

11. When assembly is correctly adjusted, tighten nuts. Check that solenoid assembly is securely attached to valve housing.
12. Carefully return valve assembly to unit and connect all wiring.
13. Connect hose ends to valve inlet and outlet, and attach clamps.
14. Unlock building electrical supply disconnect switch and set to ON. Turn power switch to ON.
15. Check valve operation. If solenoid "hums," check alignment of solenoid and adjust as necessary.

SEAL REPLACEMENT

If water flows through the seal when valve is closed, replace valve seal as follows:

1. Lock electrical disconnect switch to OFF, position power switch to OFF and close unit supply valves.
2. Open service side access doors (if installed).
3. Remove clamps and disconnect hose ends from valve inlet and outlet.

NOTE: Make note of electrical connections for reassembly.

4. Disconnect all electrical wiring from the valve.
5. Carefully lift valve out of unit.
6. Remove nuts, washer and worn seal from inlet end of valve housing.
7. Place new seal in valve housing and fasten with washer and nuts previously removed.
8. Carefully return valve assembly to unit and reconnect all wiring.
9. Connect hose ends to valve inlet and outlet, and attach clamps.
10. Unlock building electrical supply disconnect switch and set to ON. Turn power switch to ON.
11. Check valve operation. If solenoid "hums," check alignment of solenoid and adjust as necessary.

⚠ WARNING: ELECTRIC SHOCK AND/OR BURN HAZARD

- **Lock building electrical supply disconnect switch to OFF, close unit supply valves, and position power switch to OFF before performing any service on the unit. When power switch is ON valves are energized, and if cycle is started hot water/steam would enter piping.**

⚠ WARNING: BURN HAZARD

- **Allow unit to cool down before performing any service on pump. Piping and valves become very hot during unit operation.**

⚠ WARNING: FALL HAZARD

- **To prevent falls, keep floors dry. Promptly clean up any spills or drippage.**

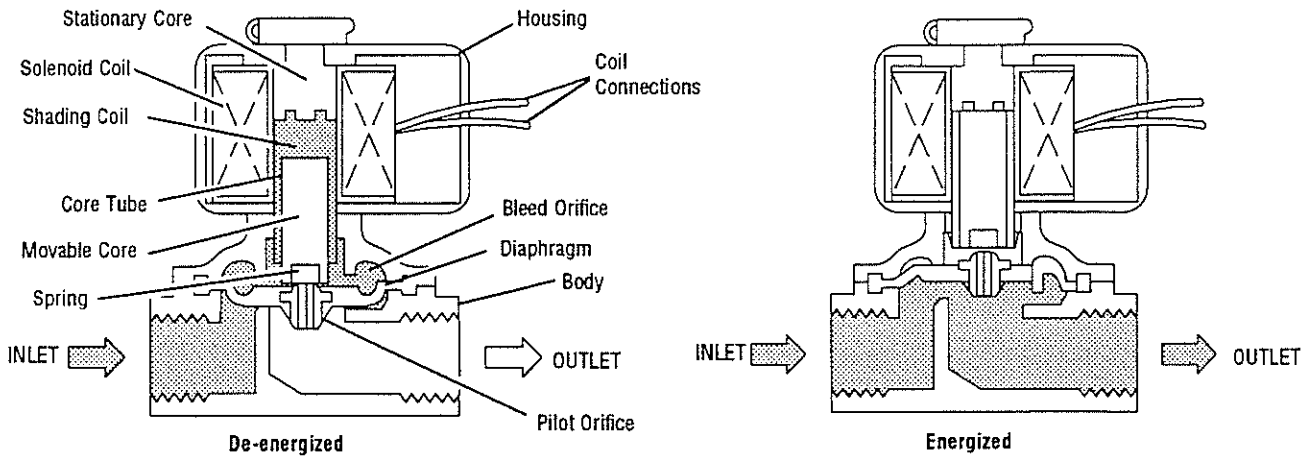


Figure 7-19. Diaphragm-type Solenoid Valve

7.8.3 **Water and Steam Solenoid Valve** (Figures 8-14 and 8-17)

The water and steam solenoid valves are diaphragm-type solenoid valves and must be serviced whenever valve is leaking, or whenever valve operation fails (either open or closed).

The diaphragm-type solenoid valve (see Figure 7-19) has a pilot and bleed orifice. It utilizes line pressure for operation. When the solenoid is energized, it opens the pilot orifice and releases pressure from the top of the valve piston or diaphragm to the outlet side of the valve. This results in an unbalanced pressure which causes the line pressure to lift the piston or diaphragm off the main orifice, thereby opening the valve. When the solenoid is de-energized, the pilot is closed and full line pressure is applied to the top of the piston or diaphragm through the bleed orifice, thereby providing a seating force for tight closure.

If valve fails to operate, proceed as follows:

1. Check strainers. Strainer can easily become clogged enough to prevent flow.
2. Energize the solenoid coil. A metallic click signifies solenoid operation. Absence of a click can indicate loss of power supply, defective coil or improper connection. To correct check the following:
   a. Voltage across the coil leads. When energized by the controller, it should be approximately 120 volts. When de-energized, it should be approximately 2 volts.
   b. Solenoid coil for open circuit or ground.
3. Energize and de-energize the coil. Check valve operation for proper opening and closing. A loud hum and sluggish operation indicate the coil is probably defective. To replace coil, proceed as follows:
   a. Disconnect terminal wires and remove the top screw and cover.
   b. Lift off the coil and save any shim material around the pole piece. Shim must be replaced in new coil or vibration noise will occur.
   c. Slip new coil in place and shim so that it fits tightly on the pole piece.
4. Check valve diaphragm. Pinhole on downstream side of diaphragm may be clogged, or diaphragm may be installed backwards.
5. Inspect the valve for evidence of leakage. A worn valve seat will cause the valve to leak when closed. A damaged or worn seat cannot be repaired. If seat is damaged, valve must be replaced.

⚠ CAUTION:

- **Solenoid valves are equipped with a special material which can be attacked by oils and grease. When replacing entire valve, wipe threads clean of cutting oils and use Teflon® tape to seal pipe joints.**

A leaking valve can also be due to a worn diaphragm. Diaphragm must be replaced according to manufacturer's instructions included in the repair kit. The valve repair kit includes all parts necessary for a complete valve overhaul.

NOTE: When replacing diaphragm, bonnet screws should be torqued to 50 in/lbs (280 cm/kg) when valve is reassembled.

Another reason for valve leakage is that foreign matter may be interfering with diaphragm movement. When overhauling valve, thoroughly inspect valve for small solder beads or Teflon tape.

NOTE: When installing/repairing diaphragm-type valves, it is necessary to separate solenoid base from valve bonnet to facilitate removal, repair and/or installation. When valve is reassembled, make sure no Teflon tape or pipe sealer is used between solenoid base and valve bonnet (see O-ring seal shown in Figure 7-20). When Teflon tape or pipe sealer is used, it can find its way into core tube and inhibit proper travelling of core/disc. If core/disc does not seat correctly into copper ring at top inside of core tube, valve will emit an audible buzzing sound.

⚠ WARNING: ELECTRIC SHOCK AND/OR BURN HAZARD

- **Lock building electrical supply disconnect switch to OFF, close unit supply valves, and position power switch to OFF before performing any service on the unit. When power switch is ON valves are energized, and if cycle is started hot water/steam would enter piping.**

⚠ WARNING: FALL HAZARD

- **To prevent falls, keep floors dry. Promptly clean up any spills or drippage.**

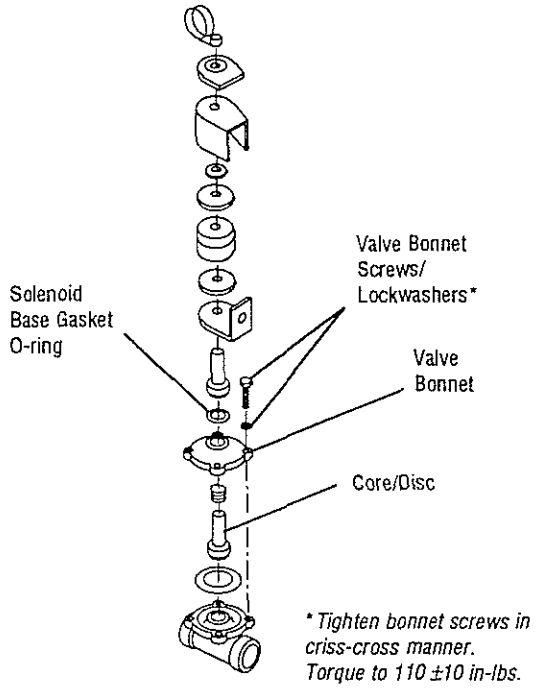

Valve Bonnet Screws/ Lockwashers*
Solenoid Base Gasket O-ring
Valve Bonnet
Core/Disc
*Tighten bonnet screws in criss-cross manner. Torque to 110 ±10 in-lbs.

Figure 7-20. Solenoid Valve, Exploded View

7.9 WATER TEMPERATURE BOOSTER TANK (Optional)

7.9.1 Water Level Switch Adjustment

To raise or lower water level limit in booster tank, adjust the water level switch as follows:

1. Lock electrical disconnect switch to OFF, position power switch to OFF and close unit supply valves.
2. Open service side access doors (if installed).
3. Locate booster tank water level control switch (see Figure 8-17).
4. Remove set screw from side of switch housing. Pull level sensor assembly up and out of housing (see Figure 7-21).
5. Loosen the two nuts on top of switch assembly. Turn level sensor clockwise to raise water level limit, or turn level sensor counterclockwise to lower water level limit. Tighten nuts to hold sensor in desired position.
6. Replace level sensor assembly in switch housing. Replace and tighten set screw.
7. Unlock building electrical supply disconnect switch and set to ON. Open unit supply valves and turn power switch to ON. When READY light comes on, press START to run a cycle. Check that chamber water is at desired level.

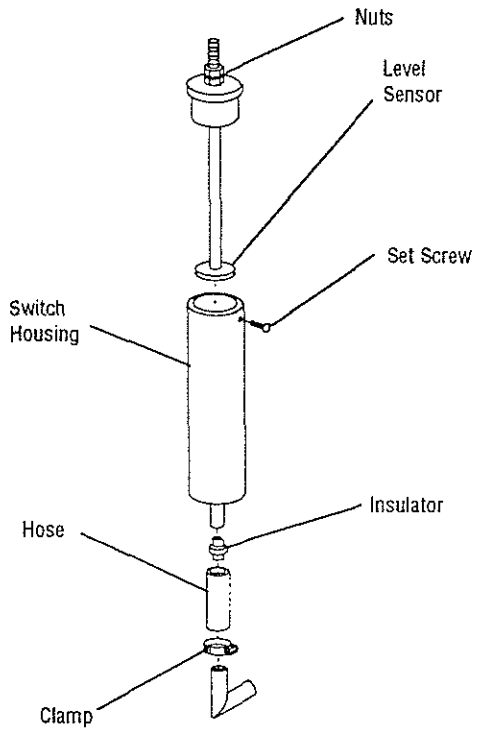


Figure 7-21. Booster Tank Water Level Switch

7.9.2 Water Level Switch Insulator Replacement

1. Lock electrical disconnect switch to OFF, position power switch to OFF and close unit supply valves.
2. Open service side access doors (if installed).
3. Locate booster tank water level switch (see Figure 8-17).

NOTE: Connection is tight between insulator and housing. Pliers may be needed to remove insulator from bottom of switch housing.

4. Remove clamps and disconnect hose from bottom of switch housing (see Figure 7-21).
5. Push new insulator into bottom of housing. Connect hose to housing and attach clamps.
6. Unlock building electrical supply disconnect switch and set to ON. Open unit supply valves and turn power switch to ON. When READY light comes on, press START to run a cycle. Check water level switch for leaks.

7.9.3 Thermostat Replacement

If thermostat is not operating properly, replace as follows:

1. Lock electrical disconnect switch to OFF, position power switch to OFF and close unit supply valves.
2. Open service side access doors (if installed).
3. Locate booster tank thermostat mounted on left side of booster tank (see Figure 8-17).

NOTE: Make note of electrical connections for reassembly.

4. Disconnect all electrical connections from thermostat.
5. Remove thermostat probe from probe housing.
6. Remove screws attaching thermostat to booster tank. Remove thermostat.
7. Attach new thermostat to tank.
8. Spread conductive paste on thermostat probe. Insert probe into probe housing.
9. Reconnect all wiring.
10. Turn knob until dial indicator is pointing to 82°C (180°F). Once thermostat is adjusted, remove screw and knob and discard both. Insert tamper-proof plug into dial (see Figure 7-22).

NOTE: If it is necessary to adjust thermostat after knob has been discarded and plug inserted, remove tamper-proof plug from dial and, using a small screwdriver, turn dial until dial indicator is pointing to desired setting. Reinsert plug into dial.

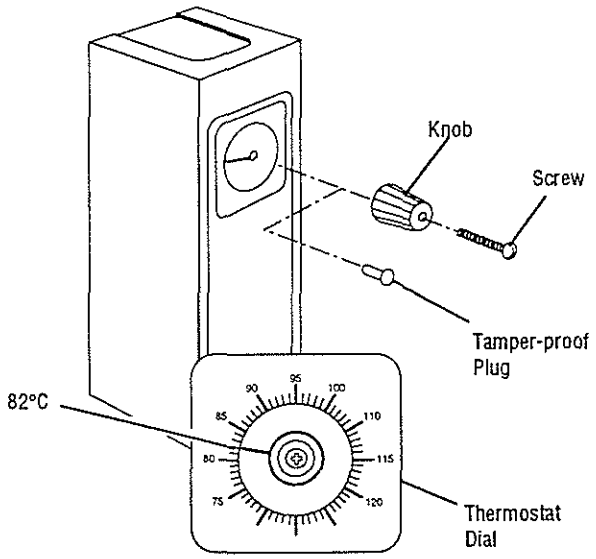


Figure 7-22. Booster Tank Thermostat Adjustment

11. Unlock building electrical supply disconnect switch and set to ON. Open unit supply valves and turn power switch to ON. Set control for WASH only phase. When READY light comes on, press START and check temperature of water entering chamber. Water should be 180°F +10°/-0°F (82°C +5°/-0°C). If water temperature is above or below these limits, adjust thermostat.

⚠ WARNING: ELECTRIC SHOCK AND/OR BURN HAZARD

- **Lock building electrical supply disconnect switch to OFF, close unit supply valves, and position power switch to OFF before performing any service on the unit. When power switch is ON valves are energized, and if cycle is started hot water/steam would enter piping.**

⚠ WARNING: FALL HAZARD

- **To prevent falls, keep floors dry. Promptly clean up any spills or drippage.**

7.10 DRYING PACKAGE (Optional)

7.10.1 Thermostat Replacement

If thermostat is not operating properly, replace as follows:

1. Lock electrical disconnect switch to OFF, position power switch to OFF and close unit supply valves.
2. Open service side access doors (if installed).

3. Locate dryer thermostat mounted on top of unit on dryer duct (see Figure 8-21).

NOTE: Make note of electrical connections for reassembly.

4. Disconnect all electrical connections from thermostat.
5. Remove thermostat probe from probe housing.
6. Remove screws attaching thermostat to dryer duct. Remove thermostat.
7. Attach new thermostat to dryer duct.
8. Spread conductive paste on thermostat probe. Insert probe into probe housing.
9. Reconnect all wiring.
10. Unlock building electrical supply disconnect switch and set to ON. Open unit supply valves and turn power switch to ON. When READY light comes on, press START and check temperature air in vent duct. Air should be 240°F ±10°F (115°C ±6°C).

7.10.2 Thermostat Adjustment

The setpoint limit is the only adjustment that can be made on the electronic thermostat. The setpoint limit prevents dryer from overheating if thermostat dial is accidently set to an excessive temperature.

Adjust setpoint limit as follows (see Figure 7-23):

1. Turn dial to desired limit value.
2. Using a small screwdriver, turn potentiometer all the way clockwise, then slowly turn potentiometer counterclockwise until LED goes off.

7.10.3 Motor and Belt Replacement

Motor Replacement (see Figure 8-22)

1. Lock unit electrical disconnect switch to OFF.
2. Remove belts from fan and motor pulleys.
3. Remove motor from motor plate by loosening nuts securing motor in position.
4. Level motor plate by adjusting nuts on the four corner posts and measure the distance from the motor plate to the base at each corner, ensuring they are equal at approximately 3 inches (7.5 cm) distance.
5. Install motor on the motor plate and fasten the bolts in place (fingertight only) ensuring that the motor is square with the motor plate.

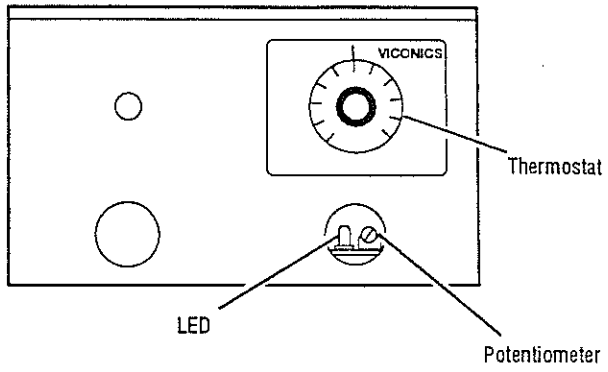


Figure 7-23. Dryer Thermostat Adjustment

6. Reinstall fan belts using the Belt Replacement procedure, below.

Belt Replacement (see Figure 8-22)

1. Lock unit electrical disconnect switch to OFF.
2. Remove belts from fan and motor pulleys.
3. Install the pulley on the fan shaft and lock into place. Make sure that the pulley is positioned centrally with the belt well.
4. Install the pulley on the motor shaft and check the alignment with the pulley installed on the fan shaft. To check alignment of the pulleys, take a steel straight edge along the outside face of both pulleys. Misalignment will show up as a gap between the pulley face and the straight edge (see Figure 7-24) and can be corrected by adjusting motor base or pulley position to make sure that both pulleys are square to each other.

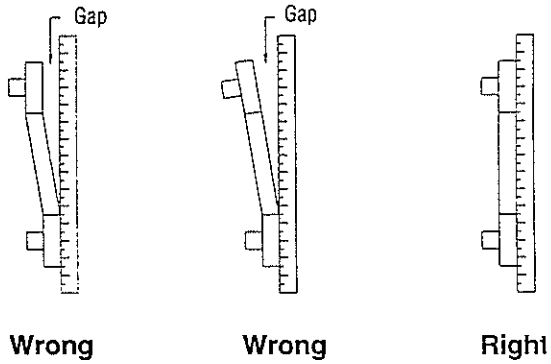


Figure 7-24. Pulley Alignment

5. When alignment is correct, lock the pulley on the shaft and the motor to the motor plate.

6. Slip the belts over the pulleys and proceed to tension them by raising the motor. This is done by adjusting the nuts on the corner posts.
7. Tension the belts to 5 lbs. deflection force at a deflection distance of 0.25 inch (or by using tension tester set at 16 inch center distance mark) (see Figure 7-25).
8. When the tension is correct, recheck alignment and lock the adjusting nuts in place.
9. Unlock unit electrical disconnect switch and position to ON. Check for proper fan operation.

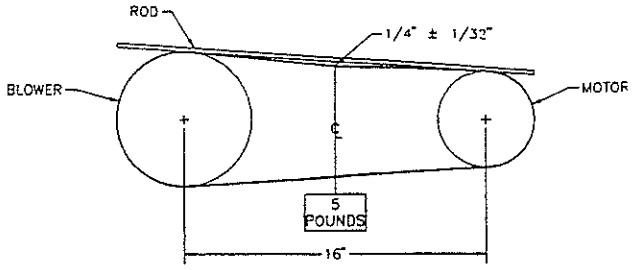


Figure 7-25. Belt Tension

SECTION 8: Exploded Views and Parts Lists

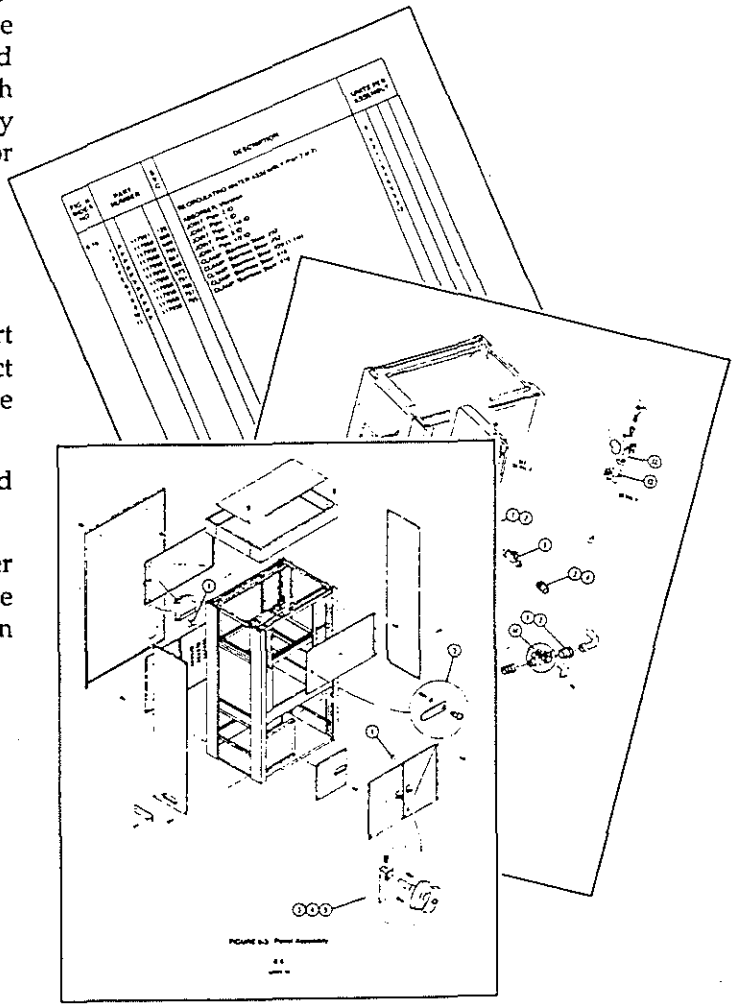
Assemblies and components of Reliance 120/220 Hospital Cart Washers are illustrated and identified on the following pages. The part number, the description and the quantity required for each usage are given. Each indentation in the description represents the assembly level. The UNITS PER ASSEMBLY column is specific for the given assembly or subassembly level.

HOW TO USE THE ILLUSTRATED PARTS BREAKDOWN

① Determine the function and application of the part required. Turn to the list of illustrations and select the most appropriate title. Note the illustration page number.

② Turn to the page indicated and locate the desired part on the illustration.

③ From the illustration, obtain the index number assigned to the part desired. Refer to the accompanying description for specific information regarding the part.

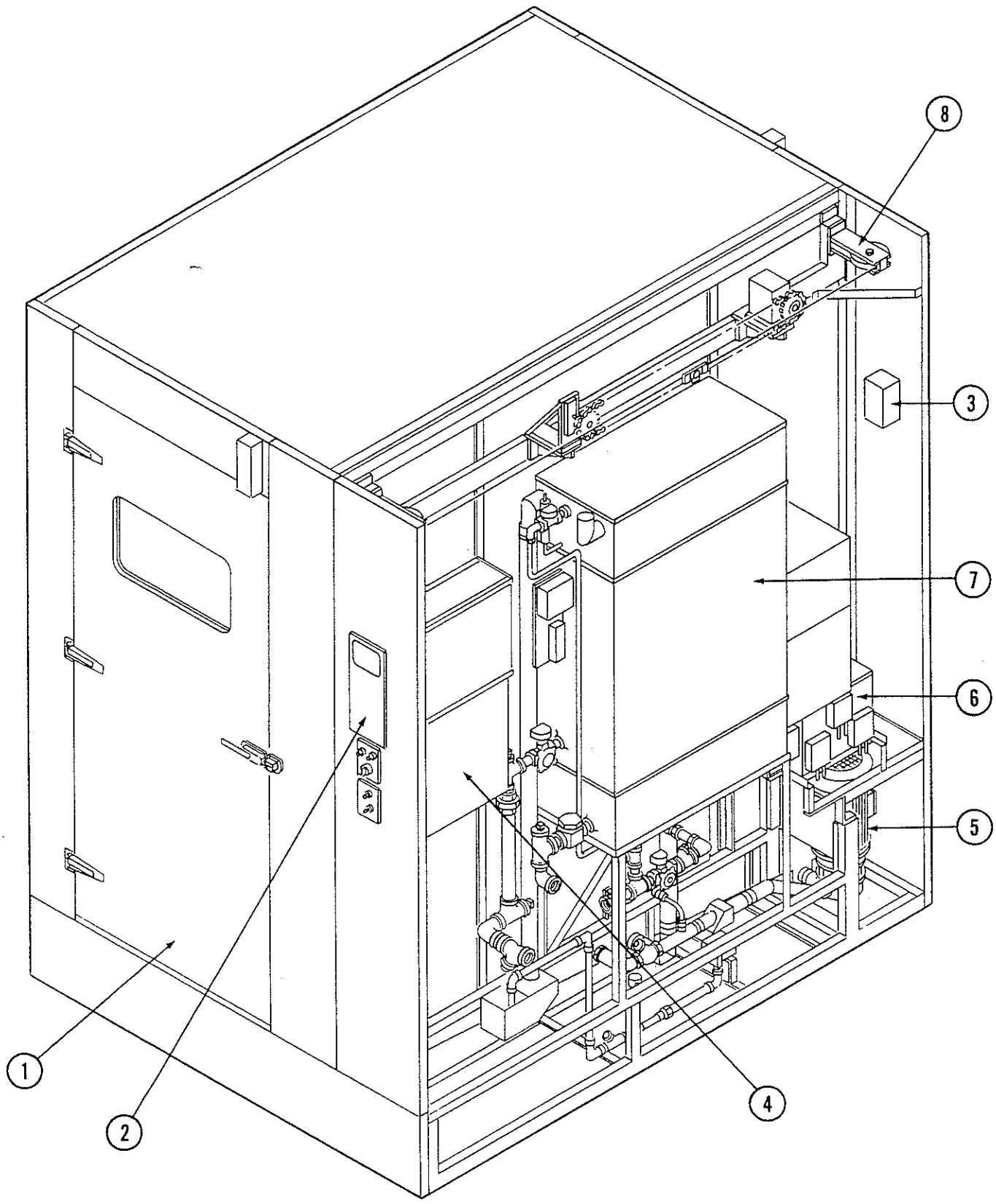


Typical Indentation Example

No Indentation – part of top assembly

One Indentation – first subassembly, part of assembly under which it is indented

2	P	117950	005	SCREEN, Filter, Travelling Spray Manifol
3	P	117950	135	ASSEMBLY, Pump Motor (7-1/2 HP) and
4	P	117950	024	CONTROL, Chamber Water Level .....
5	P	117951	024	INSULATOR, Water Level Control .....
6	P	117950	692	HOSE, 1/2 Dia. x 2-1/4 .....
7	P	117950	783	CLAMP, Stainless Steel, #4, 3/8 .....
8	P	117950	223	VALVE, Solenoid, Diverter Drain (see Fig
	P	117950	226	• KIT, Repair .....
	P	117950	172	• SOLENOID .....
9	P	117950	219	VALVE, Check Swing, 1-1/2 .....
10	P	117950	215	BREAKER, Vacuum, 1/2 .....
11	P	117950	217	VALVE, Check Swing, 1 .....



MODEL 120 SHOWN

Figure 8-1. Hospital Cart Washer, Complete

FIG. & INDEX NO.	PART NUMBER	SVC	DESCRIPTION	UNITS PER ASSEMBLY			
8-1			HOSPITAL CART WASHER, COMPLETE				
			Single Door	X			
			Double Door		X		
1			ASSEMBLY, Door (see Figures 8-2 and 8-3)	1	1		
2			ASSEMBLY, Control, Front (Soiled) Side (see Figure 8-4)	1	1		
3			ASSEMBLY, Control, Back (Clean) Side (see Figures 8-2 and 8-3)		1		
4			ASSEMBLY, Electrical Box (see Figure 8-5)	1	1		
5			ASSEMBLY, Recirculating Pump (see Figures 8-12 and 8-13)	1	1		
6			ASSEMBLY, Detergent and Optional Rinse Agent Injector Pumps (see Figure 8-7)	1	1		
7			ASSEMBLY, Optional Water Temperature Booster Tank (see Figures 8-14 and 8-17)	1	1		
8			ASSEMBLY, Travelling Spray Manifold Motor and Drive (see Figure 8-10)	1	1		

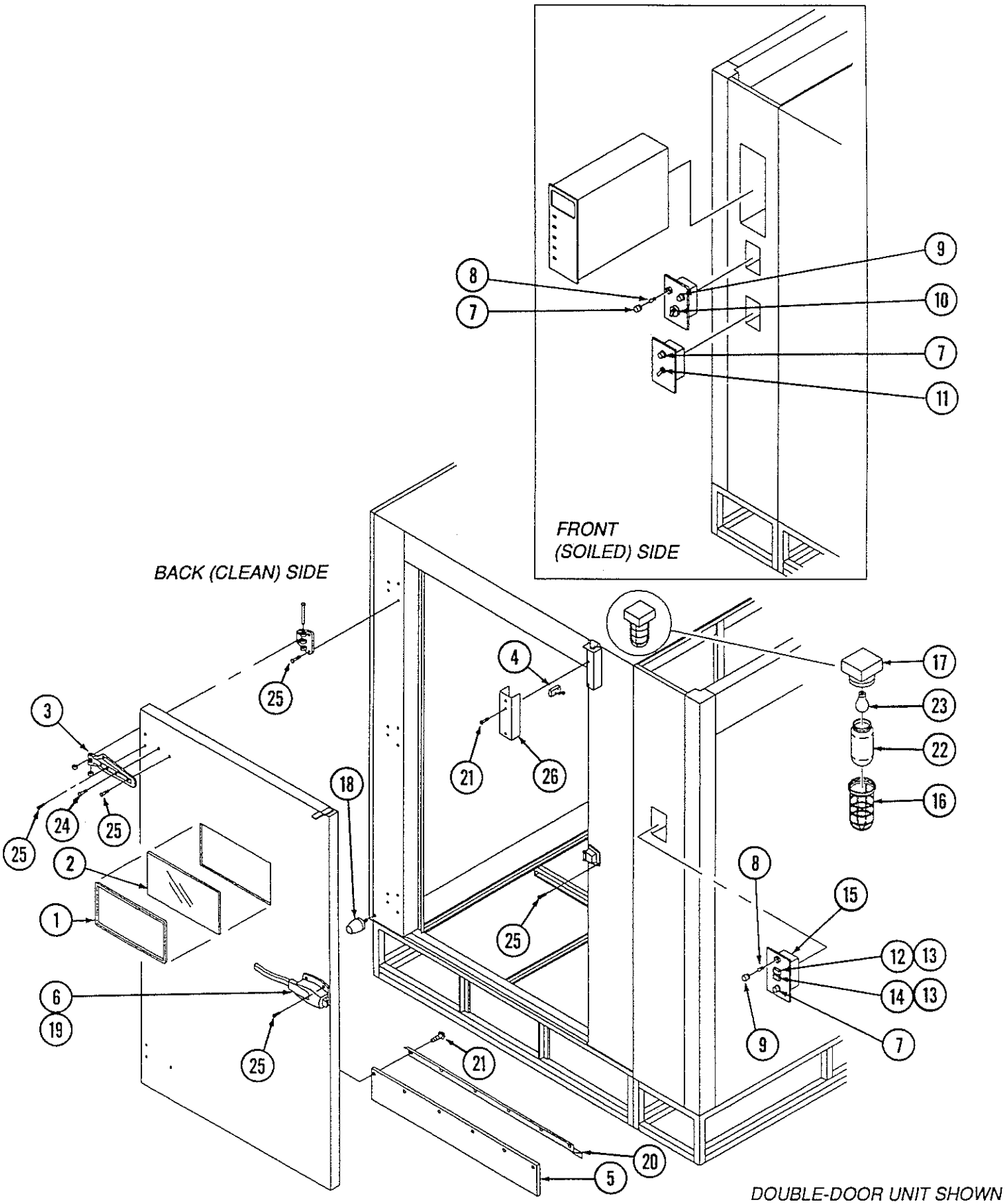


Figure 8-2. Door and Control Panel Assemblies, Model 120

FIG. & INDEX NO.	PART NUMBER			SVC	DESCRIPTION	UNITS PER ASSEMBLY			
8-2					DOOR AND CONTROL PANEL ASSEMBLIES, Model 120				
					Single Door Unit	X			
					Double Door Unit		X		
1	P	117950	034		GASKET, Window	1	2		
2	P	117950	033		GLASS, Door Window	1	2		
	P	117950	035		TOOL, Door Window Gasket Replacement	A/R	A/R		
3	P	117950	044		HINGE, Door, Complete	3	6		
	P	117903	515		• BUSHING, Door Brass (Grounding)	1	2		
4	P	117950	039		MICROSWITCH, Door	1	2		
5	P	117950	053		GASKET, Door Bottom	1	2		
6	P	117950	045		HANDLE, Door, Exterior	1	2		
7	P	117950	063		LENS, Red	2	3		
8	P	117950	069		LIGHT, Pilot (box of 10)	3	5		
9	P	117950	065		LENS, Green	1	2		
10	P	117950	257		SWITCH, Selector, ON/OFF	1	1		
	P	117951	471		SWITCH, Selector, ON/OFF, with RESET for Safety Cable	1	1		
11	P	117950	308		SWITCH, Toggle	1	1		
12	P	117950	059		BUTTON, START, Green		1		
13	P	117950	061		BLOCK, Contact, START/STOP		2		
14	P	117950	060		BUTTON, STOP, Red		1		
15	P	117950	058		OPERATOR, START/STOP, without Buttons		1		
16	P	117950	756		FIXTURE, Light (Glass, Protector & Gasket)	1	1		
17	P	117950	782		SOCKET, Light Fixture	1	1		
18	P	117958	573		BUMPER	1	2		
19	P	117956	820		HANDLE, Interior	1	2		
	P	117951	618		HANDLE, Interior (SST)	1	2		
20	P	117952	860		HOLDER, Gasket	1	2		
21	P	117950	857		SCREW, Rd. Hd. #8-32 x 1/2" Lg.	8	16		
22	P	117956	811		GLOBE, Glass	1	1		
23	P	117950	756		BULB, Light, 60 Watt	1	1		
24	P	117950	844		SCREW, Flat Hd. 1/4-20 x 1-1/4" Lg.	9	6		
25	P	117950	843		SCREW, Flat Hd. 1/4-20 x 3/4" Lg.	32	64		
26	P	117952	933		COVER, Microswitch	1	1		

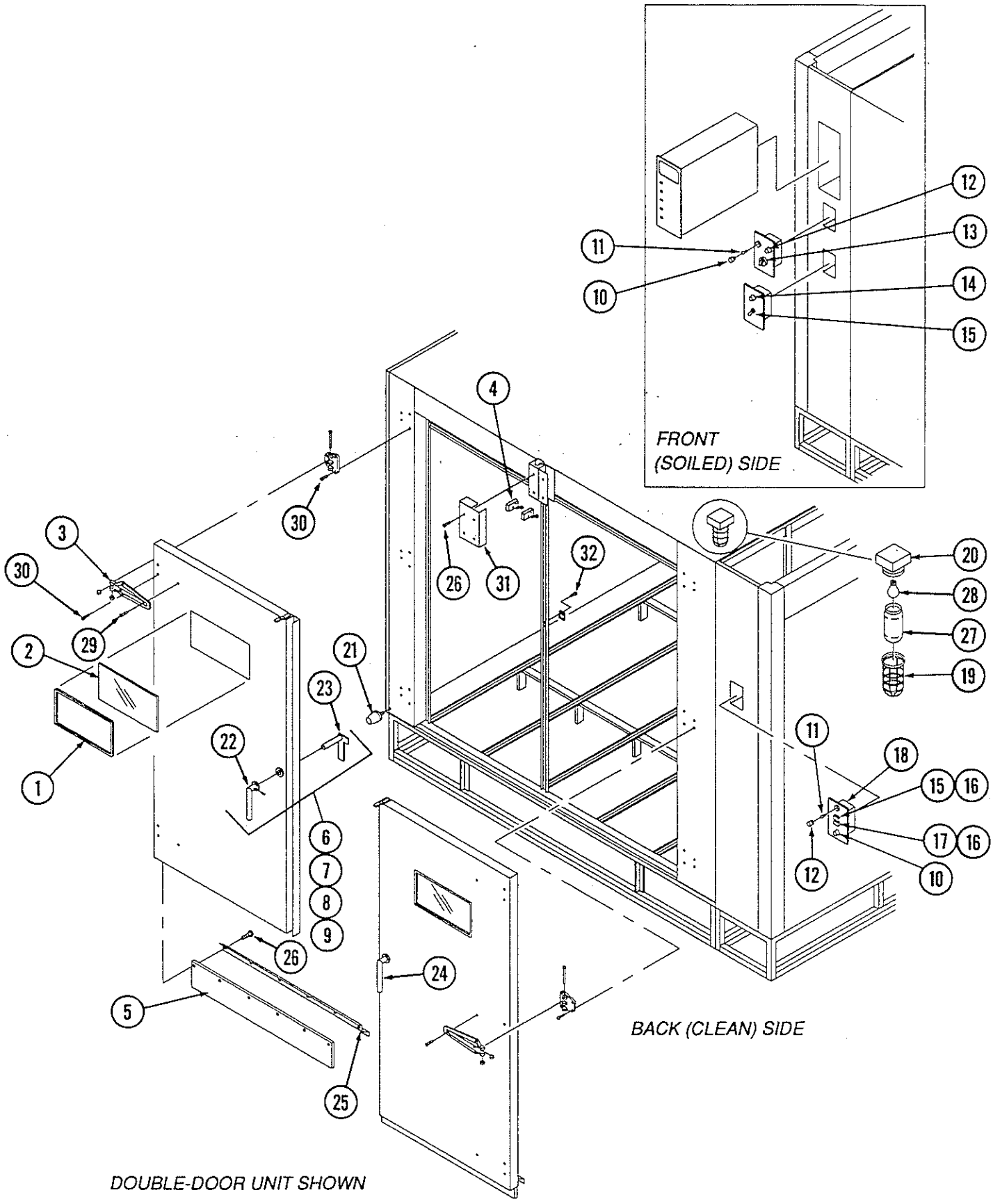


Figure 8-3. Door and Control Panel Assemblies, Model 220

FIG. & INDEX NO.	PART NUMBER			SVC	DESCRIPTION	UNITS PER ASSEMBLY			
8-3					DOOR AND CONTROL PANEL ASSEMBLIES, Model 220				
					Single Door Unit	X			
					Double Door Unit		X		
1	P	117950	034		GASKET, Window	2	4		
2	P	117950	033		GLASS, Door Window	2	4		
	P	117950	035		TOOL, Door Window Gasket Replacement	A/R	A/R		
3	P	117950	044		HINGE, Door	6	12		
4	P	117950	039		MICROSWITCH, Door	2	4		
5	P	117950	054		GASKET, Door Bottom	2	4		
6	P	117950	051		O-RING, Door Handle	2	4		
7	P	117950	055		BUSHING, Door Handle, Inside, Nylon	2	4		
8	P	117950	056		BUSHING, Door Handle, Outside, Nylon	2	4		
9	P	117950	052		BASE PLATE, Door Lock, Nylon	2	4		
10	P	117950	063		LENS, Red	2	3		
11	P	117950	069		LIGHT, Pilot (box of 10)	3	5		
12	P	117950	065		LENS, Green	1	2		
13	P	117950	257		SWITCH, Selector, ON/OFF	1	1		
	P	117951	471		SWITCH, Selector, ON/OFF, with RESET for Safety Cable	1	1		
14	P	117950	308		SWITCH, Toggle	1	1		
15	P	117950	059		BUTTON, START, Green		1		
16	P	117950	061		BLOCK, Contact, START/STOP		2		
17	P	117950	060		BUTTON, STOP, Red		1		
18	P	117950	058		OPERATOR, START/STOP, without Buttons		1		
19	P	117950	756		FIXTURE, Light	1	1		
20	P	117950	782		SOCKET, Light Fixture	1	1		
21	P	117958	573		BUMPER	2	4		
22	P	117952	775		HANDLE, Exterior, Moving	1	2		
23	P	117959	393		HANDLE, Interior, Moving	1	2		
24	P	117959	394		HANDLE, Exterior, Fixed	1	2		
25	P	117952	861		HOLDER, Gasket	1	2		
26	P	117950	857		SCREW, Rd. Hd. #8-32 x 1/2" Lg.	8	16		
27	P	117956	811		GLOBE, Glass	1	1		
28	P	117954	606		BULB, Light	1	1		
29	P	117950	844		SCREW, Flat Hd. 1/4-20 x 1-1/4" Lg.	3	6		
30	P	117950	843		SCREW, Flat Hd. 1/4-20 x 3/4" Lg.	24	48		
31	P	117952	934		COVER, Microswitch	1	1		
32	P	117950	842		SCREW, Flat Hd. 1/4-20 x 1/2" Lg.	4	8		

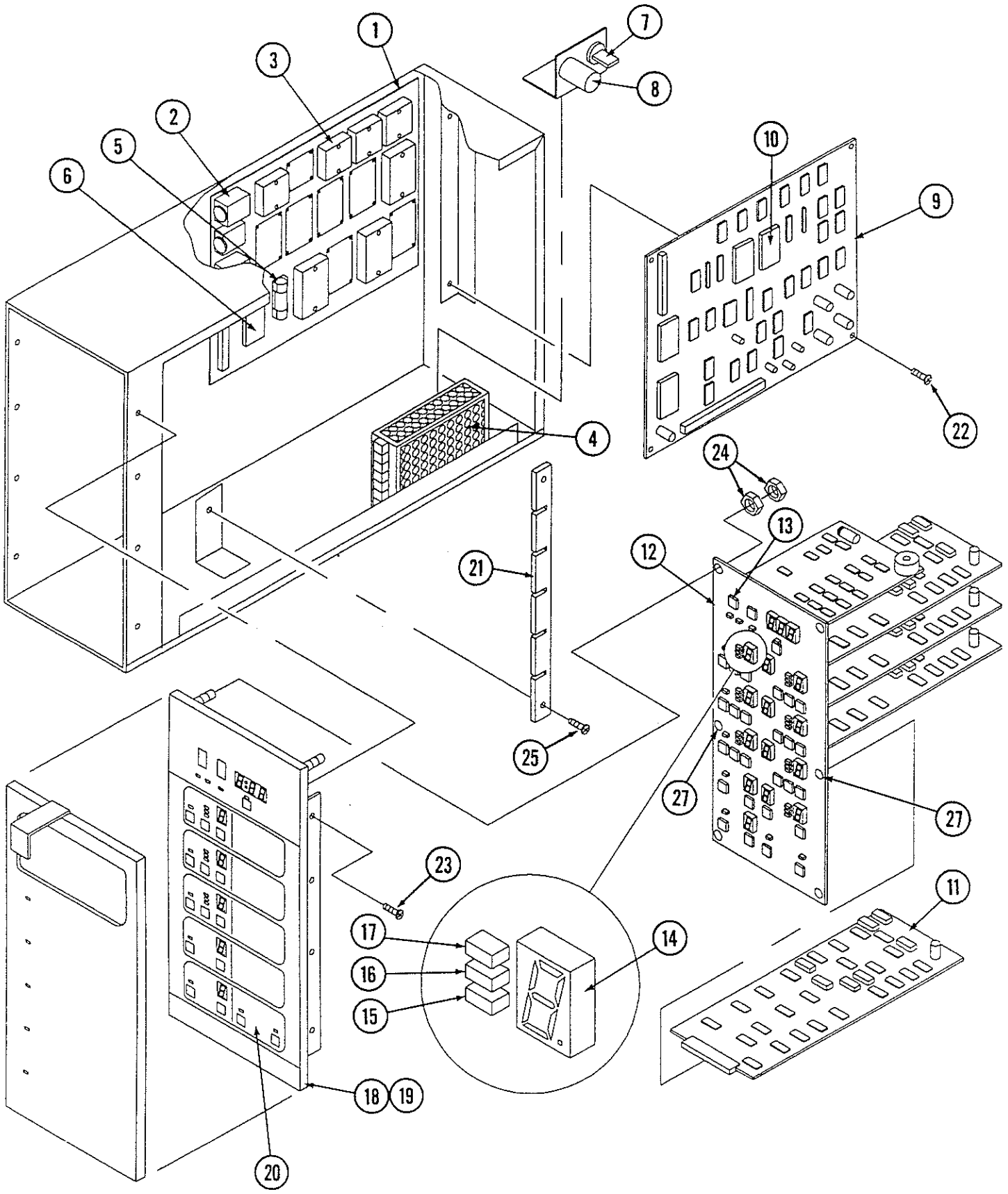


Figure 8-4. Solid-state Control Assembly

FIG. & INDEX NO.	PART NUMBER			SVC	DESCRIPTION	UNITS PER ASSEMBLY			
8-4					SOLID-STATE CONTROL ASSEMBLY				
					Units Without Drying	X			
					Units With Drying		X		
1	P	117950	296		PC BOARD, Interface (I/O)	1			
	P	117950	651		PC BOARD, Interface (I/O)		1		
2	P	117950	290		RELAY, Electromechanical, 2 Amp, 240 V	5	5		
3	P	117950	127		RELAY, Solid-state	14	14		
4	P	117950	299		SUPPLY, Power	1	1		
5	P	117950	291		FUSE, 2 Amp, 240 V (box of 10)	1	1		
6	P	117950	300		FILTER, Line	1	1		
7	P	117950	308		SWITCH, Toggle	1	1		
8	P	117950	072		FUSE, 6 Amp, 240 V (box of 5)	1	1		
9	P	117950	295		PC BOARD, Principal	1			
	P	117950	607		PC BOARD, Principal		1		
10	P	117950	301		EPROM, Memories, (set of 2, A-B)	1			
	P	117950	695		EPROM, Memories, (set of 2, A1-B1)		1		
11	P	117950	294		PC BOARD, Intermediary	5	5		
12	P	117950	293		PC BOARD, Control, (up to 9/14/91)	1	1		
	P	117951	753		PC BOARD, Kit, (from 9/15/91) (English)*				
	P	117951	802		PC BOARD, Kit, (from 9/15/91) (French)*				
13	P	117950	303		• BUTTON, Touch Pad Contact, (up to 9/14/91)	A/R	A/R		
					• BUTTON, Touch Pad Contact, (from 9/15/91, use unused buttom from existing board)				
14	P	117950	304		• READOUT, Seven-segment	A/R	A/R		
15	P	117950	307		• LED, Red	A/R	A/R		
16	P	117950	305		• LED, Yellow	A/R	A/R		
17	P	117950	306		• LED, Green	A/R	A/R		
18	P	117950	292		ASSEMBLY, Front Control Panel, (up to 3626389xxx)	1	1		
	P	117951	430		ASSEMBLY, Front Control Panel, (from 3625289xxx to 3634091xxx)				
	P	117951	801		ASSEMBLY, Front Control Panel, English, (from 3634191xxx)				
	P	117951	800		ASSEMBLY, Front Control Panel, French, (from 3634191xxx)				
	P	117951	614		• MEMBRANE, English, (up to 3634091xxx)	A/R	A/R		
	P	117951	798		• MEMBRANE, Embossed, English, (from 3634191xxx)				
	P	117951	615		• MEMBRANE, French, (up to 3634091xxx)	A/R	A/R		
	P	117951	799		• MEMBRANE, Embossed, French, (from 3634191xxx)				
19	P	117950	709		• CATCH, Magnetic, Control Panel (not shown)	1	1		
20	P	117950	302		MASKS, Control Panel, Kit of 5, (up to 3626389xxx)	1	1		
	P	117951	427		MASKS, Control Panel, Kit of 5, (from 3625289xxx to 3634091xxx)				
	P	117953	290		MASKS, Control Panel, Kit of 5, (from 3634191xxx) (for embossed membrane)				
21	P	117950	011		SUPPORT, Plastic	1	1		
	P	117950	297		CABLE, Flat, 34 Leads (not shown)	1	1		
	P	117950	298		CABLE, Flat, 60 Leads (not shown)	1	1		
22	P	117950	857		SCREW, Rd. Hd. #8-32 x 1/2" Lg.	4	4		
23	P	117950	825		SCREW, Flat Hd. #8-32 x 3/16" Lg.	8	8		
24	P	117950	950		NUT, Hex. #8-32	8	8		
25	P	117950	858		SCREW, Rd. Hd. #8-32 x 3/4" Lg.	2	2		
26	P	117951	812		SPACER, Control PC Board, (from 3634191xxx) (not shown)				
27	P	117953	900		WASHER, Nylon, Isolating				

** Kits include board, panel, stickers and mask.*

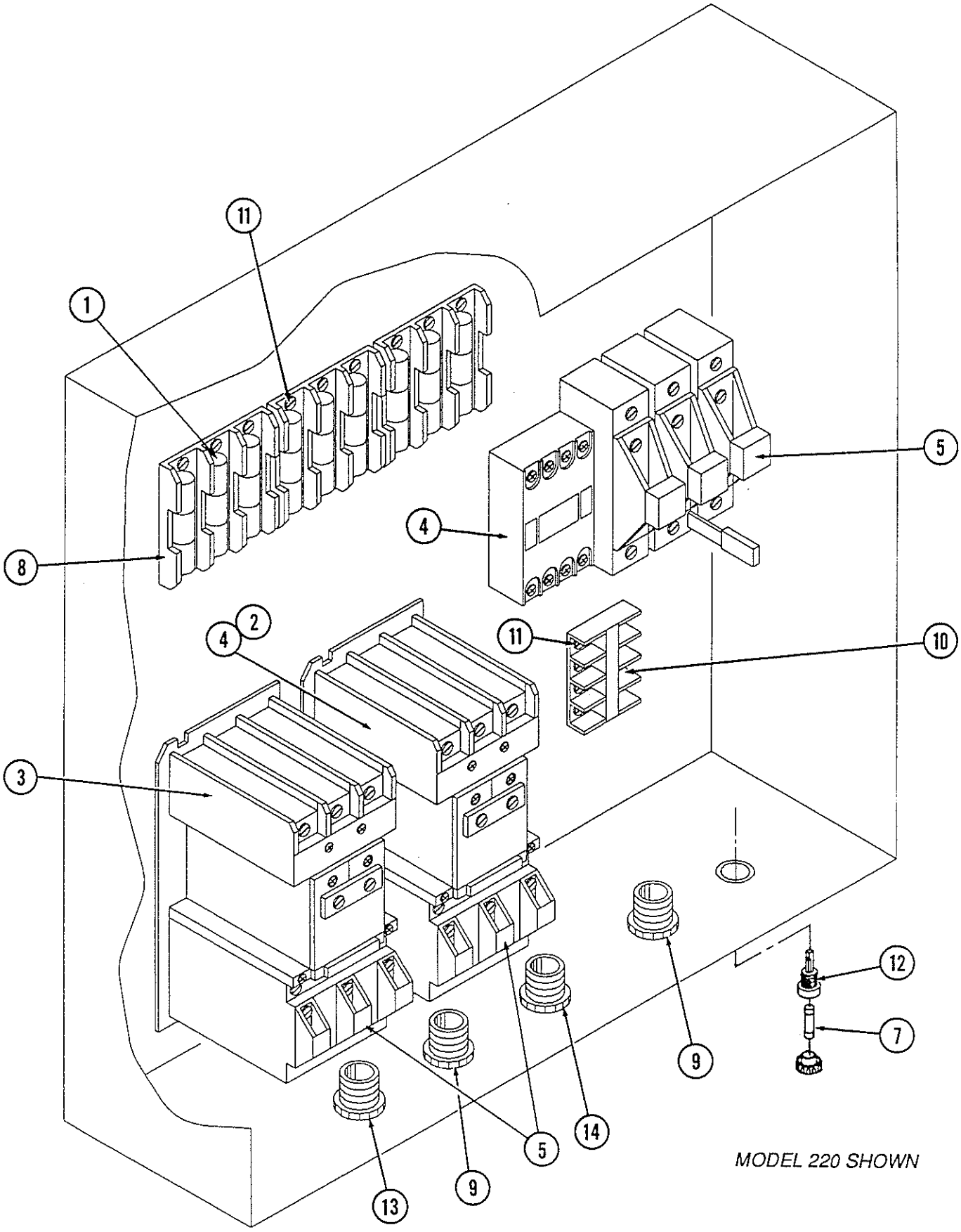
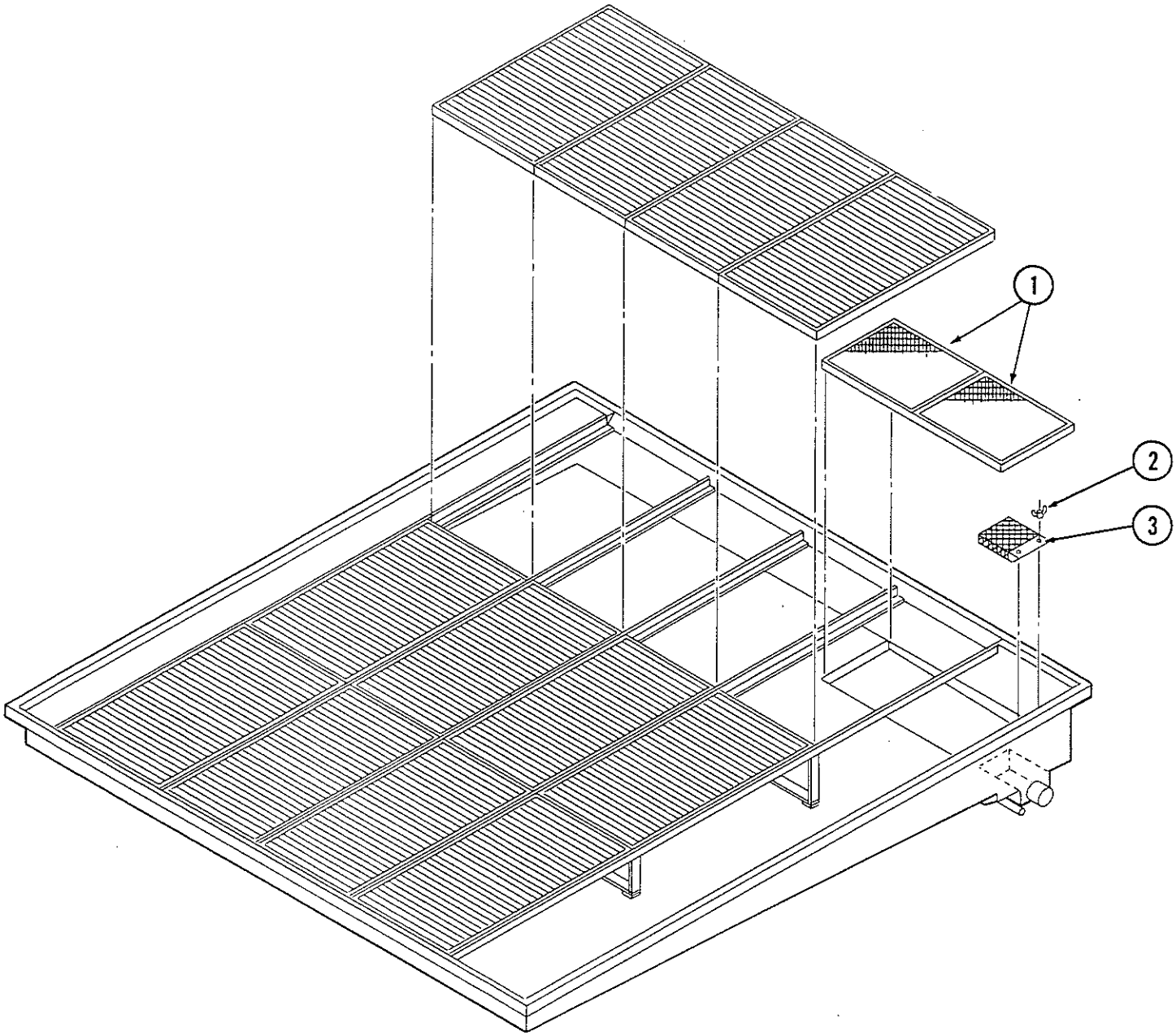


Figure 8-5. Electrical Box

FIG. & INDEX NO.	PART NUMBER			SVC	DESCRIPTION	UNITS PER ASSEMBLY			
8-5					ELECTRICAL BOX ASSEMBLY				
					Model 120	X			
					Model 220		X		
1	P	117950	110		FUSE, 4 Amp (480, 600 V units only)				
	P	117950	498		FUSE, 15 Amp, (480, 600 V units only)				
	P	117950	496		FUSE, 15 Amp, 250 V				
	P	117950	497		FUSE, 25 Amp, 250 V				
	P	117950	580		FUSE, 30 Amp, 250 V				
	P	117950	042		FUSE, 40 Amp, 250 V				
	P	117950	043		FUSE, 60 Amp, 250 V				
2	P	117950	263		STARTER, Magnetic, 509-AOD				
	P	117950	095		• COIL				
	P	117950	097		• RELAY, Overload				
3	P	117950	091		STARTER, Magnetic, 509-BOD				
	P	117950	089		• COIL				
	P	117950	098		• RELAY, Overload				
4	P	117950	094		STARTER, Magnetic, 509-TOD				
	P	117950	096		• COIL				
	P	117950	097		• RELAY, Overload				
5	P	117950	100		ELEMENT, Heater (for Starter), W-25				
	P	117951	360		ELEMENT, Heater (for Starter), W-29				
	P	117950	102		ELEMENT, Heater (for Starter), W-34				
	P	117950	099		ELEMENT, Heater (for Starter), W-35				
	P	117951	040		ELEMENT, Heater (for Starter), W-45				
	P	117950	104		ELEMENT, Heater (for Starter), W-48				
	P	117950	463		ELEMENT, Heater (for Starter), W-50				
	P	117951	041		ELEMENT, Heater (for Starter), W-55				
	P	117950	103		ELEMENT, Heater (for Starter), W-59				
	P	117951	045		ELEMENT, Heater (for Starter), W-66				
	P	117954	753		ELEMENT, Heater (for Starter), W-39				
	P	117954	598		ELEMENT, Heater (for Starter), W-37				
	P	117954	751		ELEMENT, Heater (for Starter), W-56				
	P	117950	259		ELEMENT, Heater (for Starter), W-49				
	P	117950	460		ELEMENT, Heater (for Starter), W-47				
6	P	117950	660		TRANSFORMER 240/120, 500 VA (not shown)				
	P	117950	369		TRANSFORMER 480/120, 500 VA (not shown)				
	P	117950	123		TRANSFORMER 600/120, 500 VA (not shown)				
7	P	117951	596		FUSE, 1.6 Amp, Slo-Blo, 500 V, For Transformer	2	2		
8	P	117953	889		HOLDER, Fuse, 600 V				
	P	117953	884		HOLDER, Fuse, 250V				
9	P	117953	866		CONNECTORS, Liquid Tite, 1/2" x 90°	2	2		
10	P	117953	852		BLOCK, Terminal	1	1		
11	P	117950	857		SCREW, Rd. Hd. #8-32 x 1/2" Lg.	A/R	A/R		
12	P	117950	080		HOLDER, Fuse, 250V	1	1		
13	P	117953	866		CONNECTOR, Liquid Tite, 1/2" x 90°, Right Hand Control	1	1		
	P	117953	864		CONNECTOR, Liquid Tite, 1/2" Straight, Left Hand Control	1	1		
14	P	117953	857		CONNECTOR, Straight, 1/2"	1	1		



MODEL 220 SHOWN

Figure 8-6. Floor Grates and Filters

FIG. & INDEX NO.	PART NUMBER			SVC	DESCRIPTION	UNITS PER ASSEMBLY
8-6					FLOOR GRATES AND FILTERS	X
1	P	117950	006		FILTERS, Large (Set of 2)	1
2	P	117957	192		NUT, Wing, 1/4-20	2
3	P	117952	745		FILTER	1

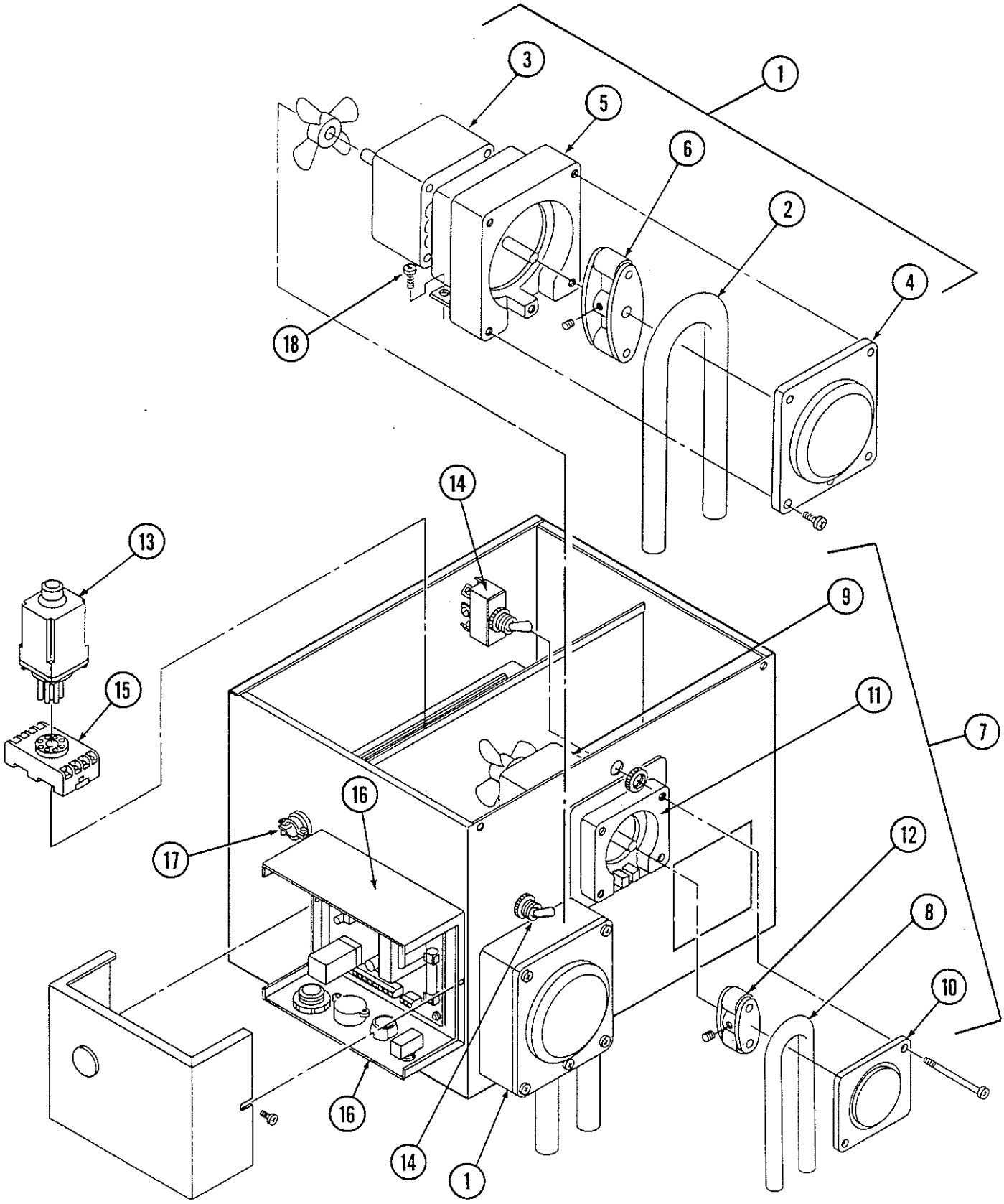


Figure 8-7. Detergent/Rinse Agent Injector Assembly

FIG. & INDEX NO.	PART NUMBER			SVC	DESCRIPTION	UNITS PER ASSEMBLY			
8-7					DETERGENT/RINSE AGENT INJECTOR ASSEMBLY Without Optional Rinse Agent Injection With Optional Rinse Agent Injection	X	X		
1	P	117950	582		PUMP, Large (Detergent)	1	1		
2	P	117950	583		• TUBE, Squeeze	1	1		
3	P	117950	585		• MOTOR, Pump	1	1		
4	P	117950	600		• COVER, Pump	1	1		
5	P	117950	602		• KIT, Head	1	1		
6	P	117950	601		• ASSEMBLY, Roller Block, Large Pump	1	1		
7	P	117950	776		PUMP, Small (Rinse Agent), Optional		1		
8	P	117950	657		• TUBE, Squeeze		1		
9	P	117951	211		• MOTOR		1		
10	P	117951	212		• COVER		1		
11	P	117951	213		• KIT, Head		1		
12	P	117951	706		• ASSEMBLY, Roller Block, Small Pump		1		
13	P	117950	117		TIMER, 0-3 Minutes		1		
	P	117951	586		TIMER, 0-1 Minutes, Alternate		1		
	P	117951	587		TIMER, 0-3 Minutes, Alternate		1		
14	P	117950	071		SWITCH, Prime	1	2		
15	P	117950	662		SOCKET		1		
16	P	117954	663		BOX, Alarm	1	1		
	P	117950	584		TUBE, Pickup, 38" with 10' line (not shown)	1	2		
	P	117950	614		SENSOR, Low-level, 38" (not shown)	1	2		
	P	117950	599		LUBRICANT, Squeeze Tube	A/R	A/R		
17	P	117953	857		CONNECTOR, Straight, 1/2"	1	1		
18	P	117950	857		SCREW, Rd. Hd. #8-32 x 1/2" Lg.	A/R	A/R		

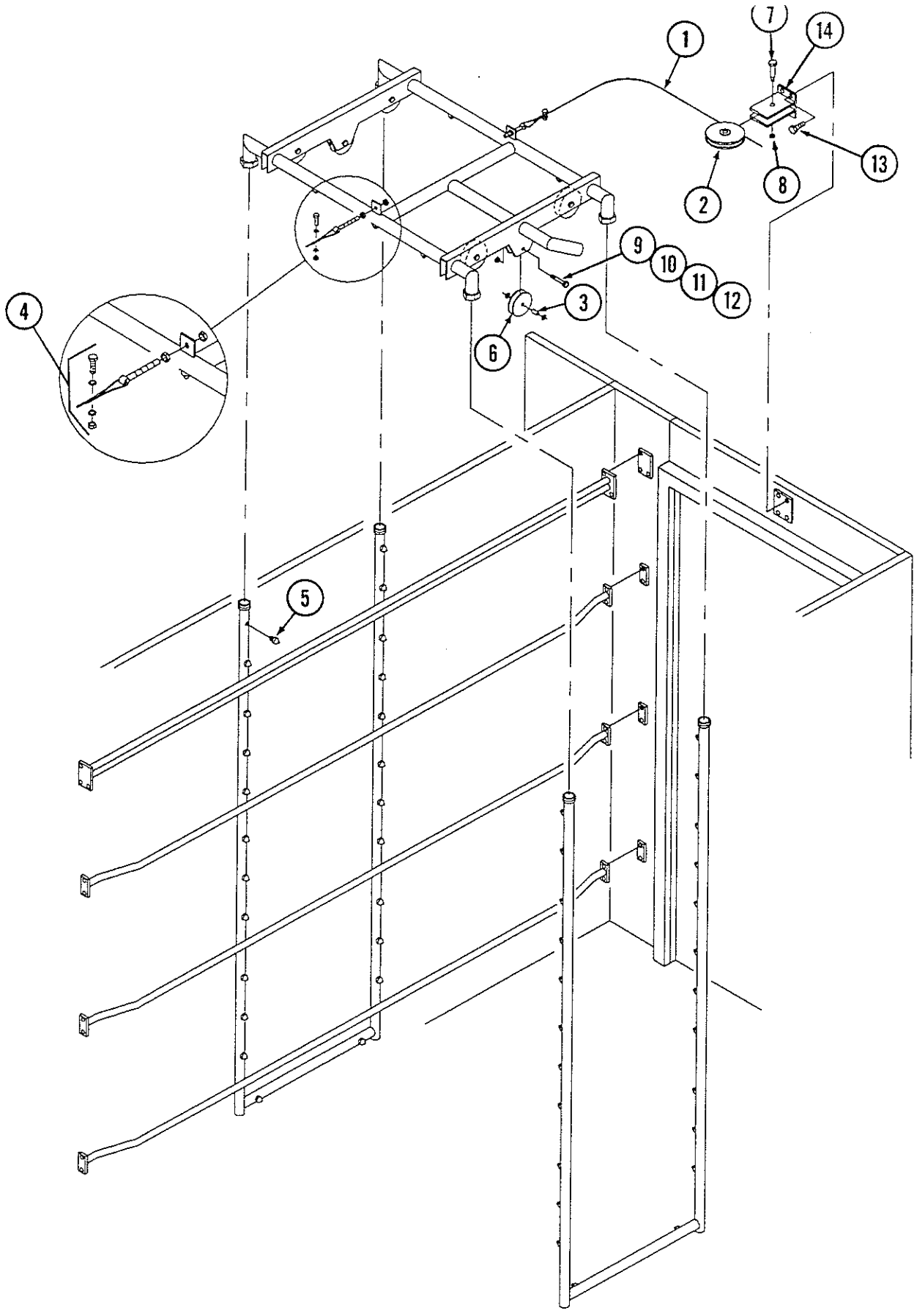


Figure 8-8. Travelling Spray Manifold Assembly, Model 120

FIG. & INDEX NO.	PART NUMBER			SVC	DESCRIPTION	UNITS PER ASSEMBLY
8-8					TRAVELLING SPRAY MANIFOLD ASSEMBLY, Model 120	X
1	P	117950	246		CABLE, Stainless Steel	1
2	P	117950	244		PULLEY, Cable	2
3	P	117950	243		WASHER, Nylon	12
4	P	117950	247		CLAMP, Cable	2
5	P	117950	248		NOZZLE, Spray, 3/8" NPT (120)	36
	P	117950	248		NOZZLE, Spray, 3/8" NPT (120L)	54
6	P	117950	242		PULLEY, Traveller	6
7	P	117958	408		BOLT, Hex. Hd. 5/8-16 x 1.635" Lg. (special)	2
8	P	117950	959		NUT, Hex. 5/8"	2
9	P	117950	911		BOLT, Hex. Hd. 5/16-18 x 2-1/4" Lg.	6
10	P	117950	977		WASHER, Flat 5/16"	6
11	P	117950	987		WASHER, Lock 5/16"	6
12	P	117950	954		NUT, Hex. 5/16"	6
13	P	117950	898		BOLT, Hex. Hd. 1/4-20 x 3/8" Lg.	44
14	P	117958	406		BRACKET, Pulley	2

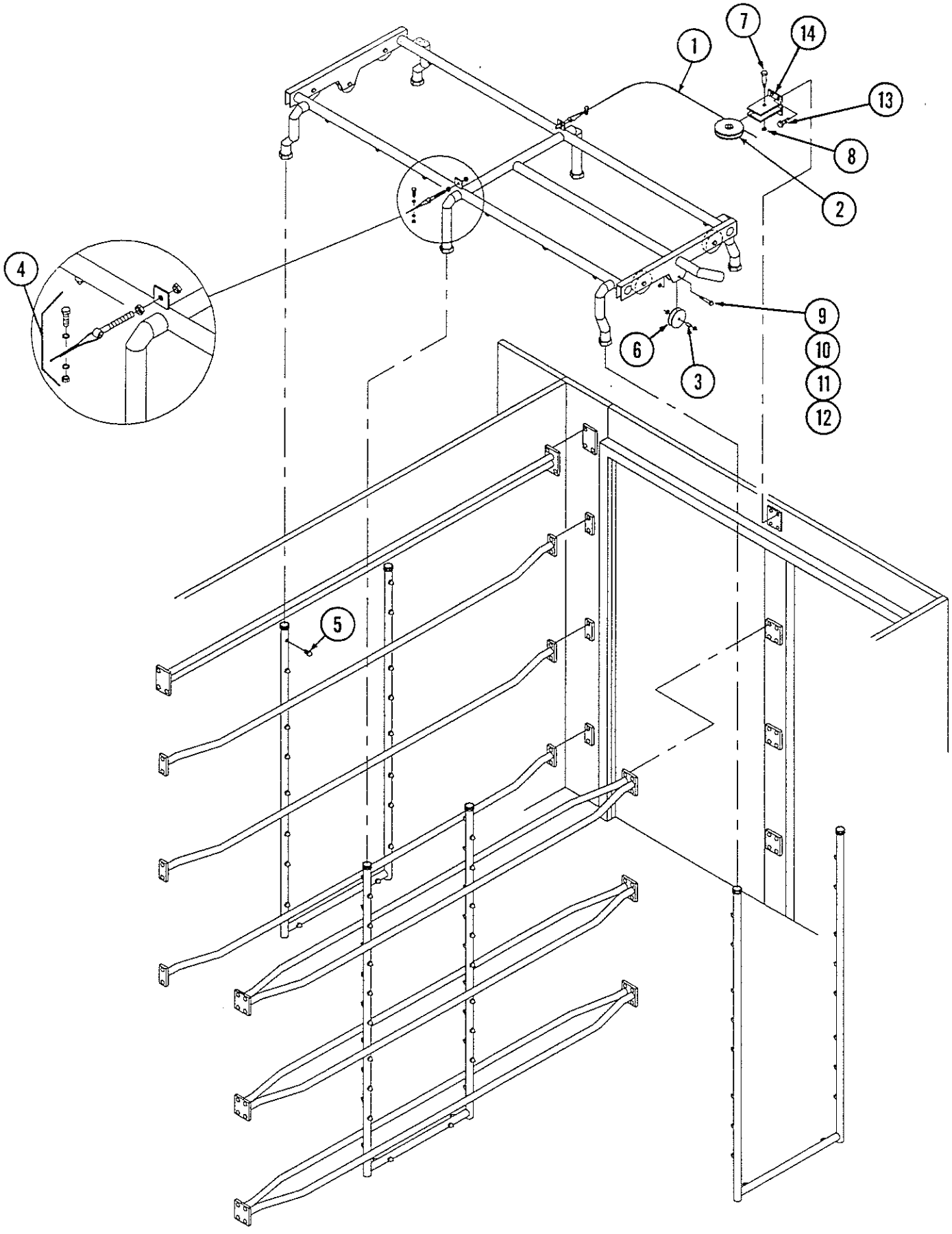


Figure 8-9. Travelling Spray Manifold Assembly, Model 220

FIG. & INDEX NO.	PART NUMBER			SVC	DESCRIPTION	UNITS PER ASSEMBLY
8-9					TRAVELLING SPRAY MANIFOLD ASSEMBLY, Model 220	X
1	P	117950	246		CABLE, Stainless Steel	1
2	P	117950	244		PULLEY, Cable	2
3	P	117950	243		WASHER, Nylon	4
4	P	117950	247		CLAMP, Cable	2
5	P	117950	249		NOZZLE, Spray, 1/4 NPT	76
	P	117950	249		NOZZLE, Spray, 1/4" NPT, 7/64" Hole (220)	76
	P	117951	519		NOZZLE, Spray, 1/4" NPT, 3/32" Hole (220L)	114
6	P	117950	242		PULLEY, Traveller	6
7	P	117958	408		BOLT, Hex. Hd. 5/8-16 x 1.635" Lg. (special)	2
8	P	117950	959		NUT, Hex. 5/8"	2
9	P	117950	911		BOLT, Hex. Hd. 5/16-18 x 2-1/4" Lg.	6
10	P	117950	977		WASHER, Flat 5/16"	6
11	P	117950	987		WASHER, Lock 5/16"	6
12	P	117950	954		NUT, Hex. 5/16"	6
13	P	117950	898		BOLT, Hex. Hd. 1/4-20 x 3/8" Lg.	68
14	P	117958	406		BRACKET, Pulley	2

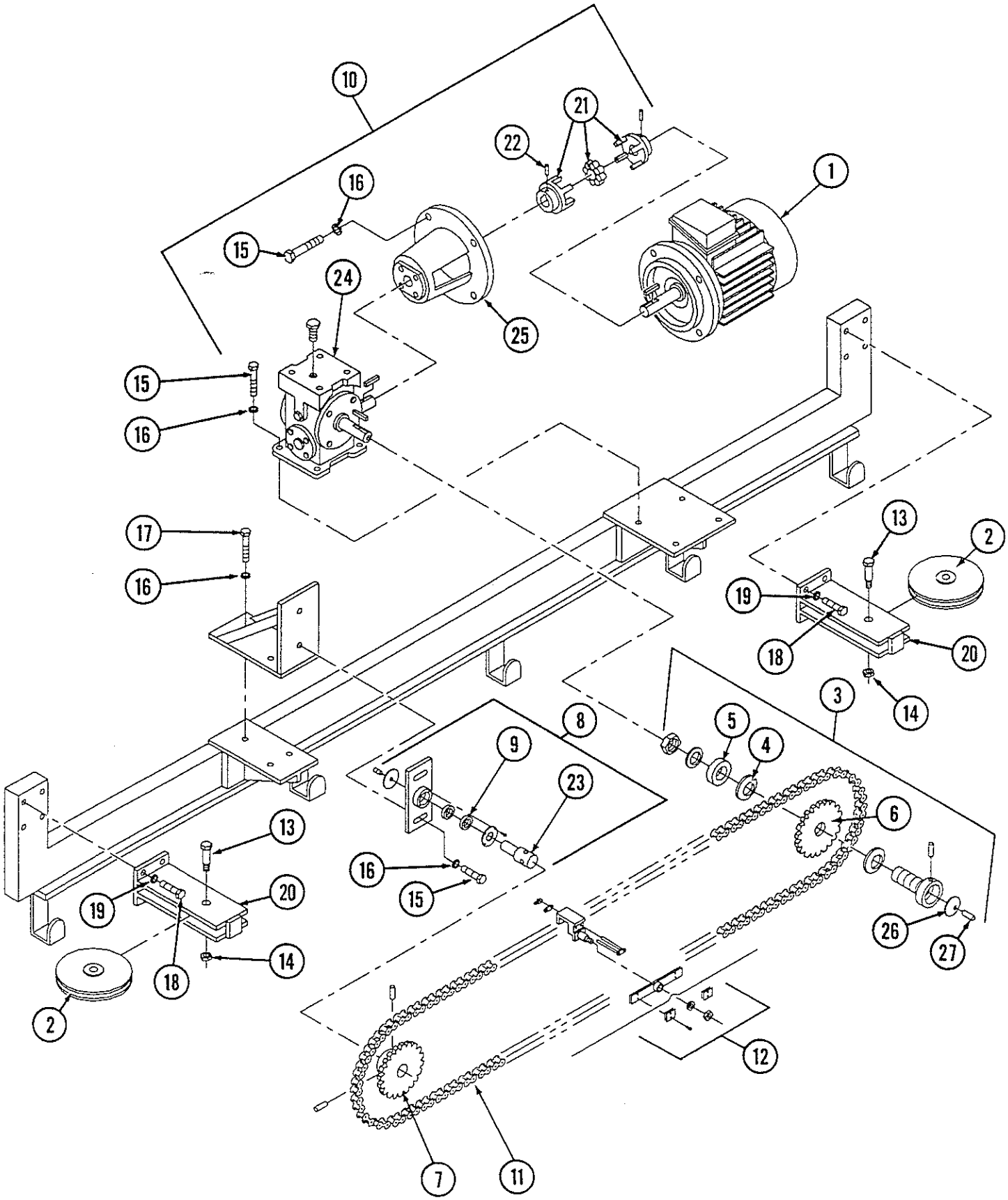


Figure 8-10. Travelling Spray Manifold Motor and Drive Assembly

FIG. & INDEX NO.	PART NUMBER			SVC	DESCRIPTION	UNITS PER ASSEMBLY
8-10					TRAVELLING SPRAY MANIFOLD MOTOR & DRIVE ASSEMBLY ...	X
1	P	117950	231		MOTOR, 1/2 HP, (up to approx. Feb. 1993)	1
	P	117902	957		MOTOR, 1/2 HP, 208/230/460V, (from Feb. 1993)	
	P	117902	958		MOTOR, 1/2 HP, 600V, (from approx. Feb. 1993)	
2	P	117950	244		PULLEY, UHMW	2
3	P	117950	238		ASSEMBLY, Friction Clutch (7 Pieces)	1
4	P	117950	239		• LINING, Friction Clutch	2
5	P	117950	237		• BEARING, Needle	1
6	P	117950	235		• SPROCKET	1
7	P	117950	234		SPROCKET	1
8	P	117950	233		ASSEMBLY, Shaft And Bearing	1
9	P	117950	236		• BEARING, Ball	1
10	P	117950	229		REDUCER, Speed Assembly	1
11	P	117950	240		CHAIN	1
12	P	117950	241		ATTACHMENT, Connecting Link	1
13	P	117958	408		BOLT, Hex. Hd. 5/8-16 x 1.635" Lg. (special)	2
14	P	117950	959		NUT, Hex. 5/8"	2
15	P	117950	916		BOLT, Hex. Hd. 3/8-16 x 1" Lg.	10
16	P	117950	988		WASHER, Lock 3/8"	13
17	P	117950	915		BOLT, Hex. Hd. 3/8-16 x 3/4" Lg.	3
18	P	117950	906		BOLT, Hex. Hd. 5/16-18 x 1" Lg.	8
19	P	117950	987		WASHER, Lock 5/16"	8
20	P	117958	405		HOLDER, Pulley	2
21	P	117950	807		CLUTCH	1
22	P	117957	232		SCREW, Set, Hex. Soc.,1/4-20 x 1/4" Lg.	2
23	P	117901	397		SHAFT, Sprocket, Screwed, Old, (up to 3616482xxx)	1
24	P	117904	137		REDUCER, Speed	1
25	P	117904	144		ADAPTOR, Speed Reducer	1
26	P	117904	138		ADAPTOR, Drive Mechanism	1
27	P	117957	251		SCREW, Hex. Hd. Cap, 1/4-20 x 3/4" Lg.	

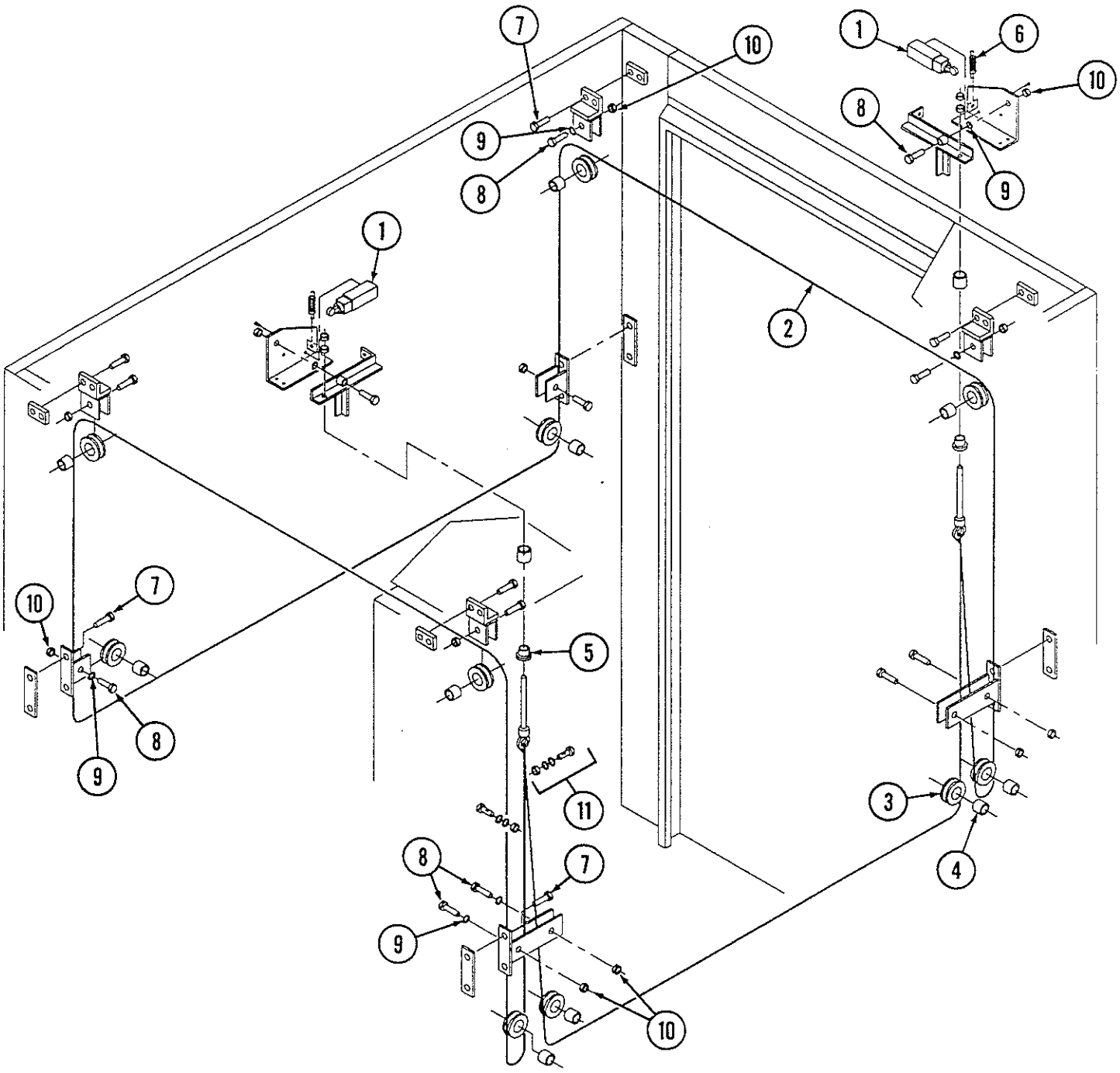


Figure 8-11. Emergency Safety Cable Assembly

FIG. & INDEX NO.	PART NUMBER			SVC	DESCRIPTION	UNITS PER ASSEMBLY
8-11					EMERGENCY SAFETY CABLE ASSEMBLY	X
1	P	117951	317		SWITCH, Limit	2
2	P	117951	483		CABLE, 3/32 x 60	10
3	P	117950	042		PULLEY	10
4	P	117950	041		BUSHING	2
5					BUSHING, Safety Cable	2
6	P	117951	484		SPRING	2
7	P	117950	898		BOLT, Hex. Hd. 1/4-20 x 3/8" Lg.	16
8	P	117950	902		BOLT, Hex. Hd. 1/4-20 x 1-1/4" Lg.	12
9	P	117950	986		WASHER, Lock 1/4"	12
10	P	117950	952		NUT, Hex. 1/4-20	12
11	P	117950	247		CABLE, Attachment	2

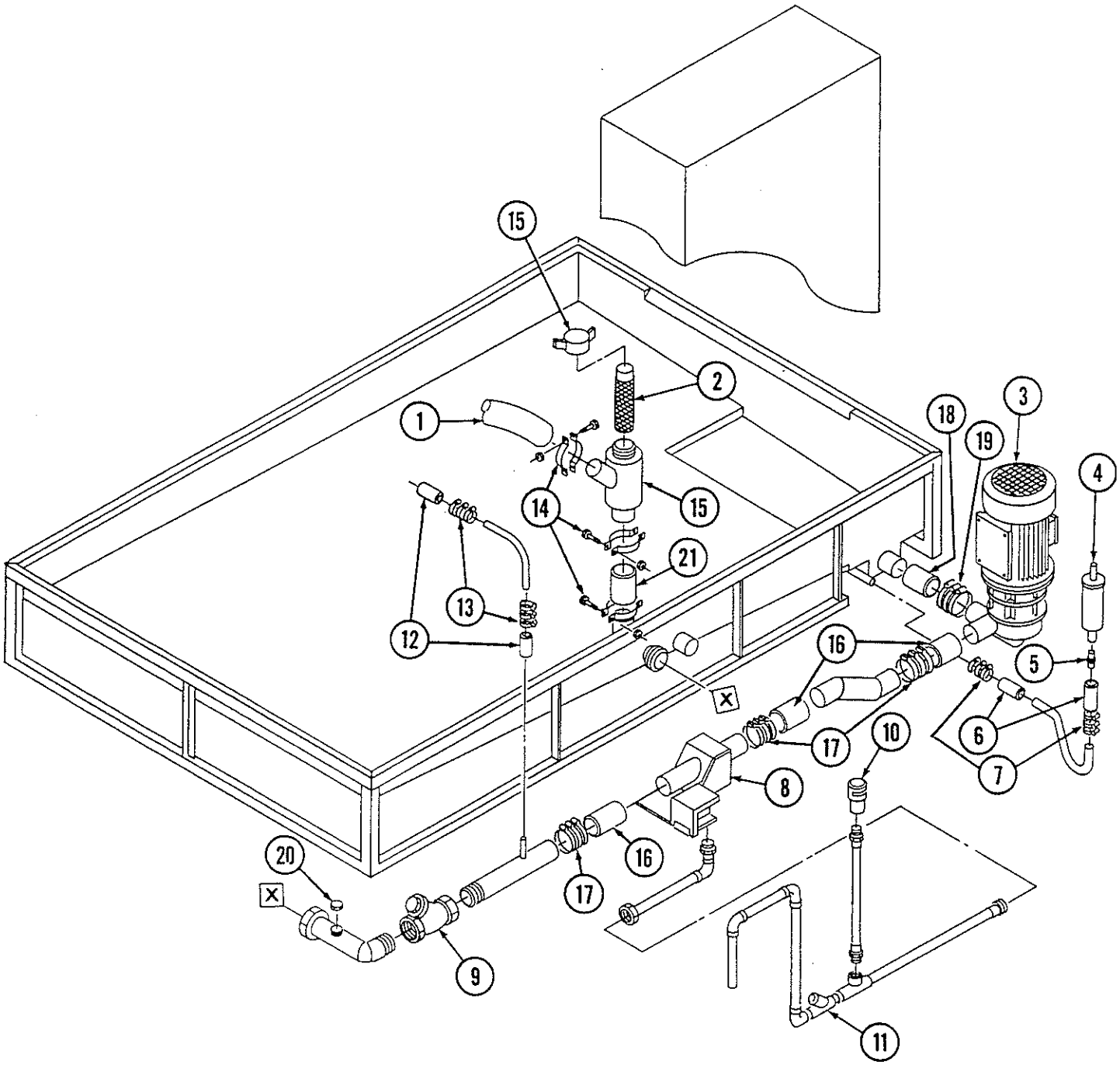
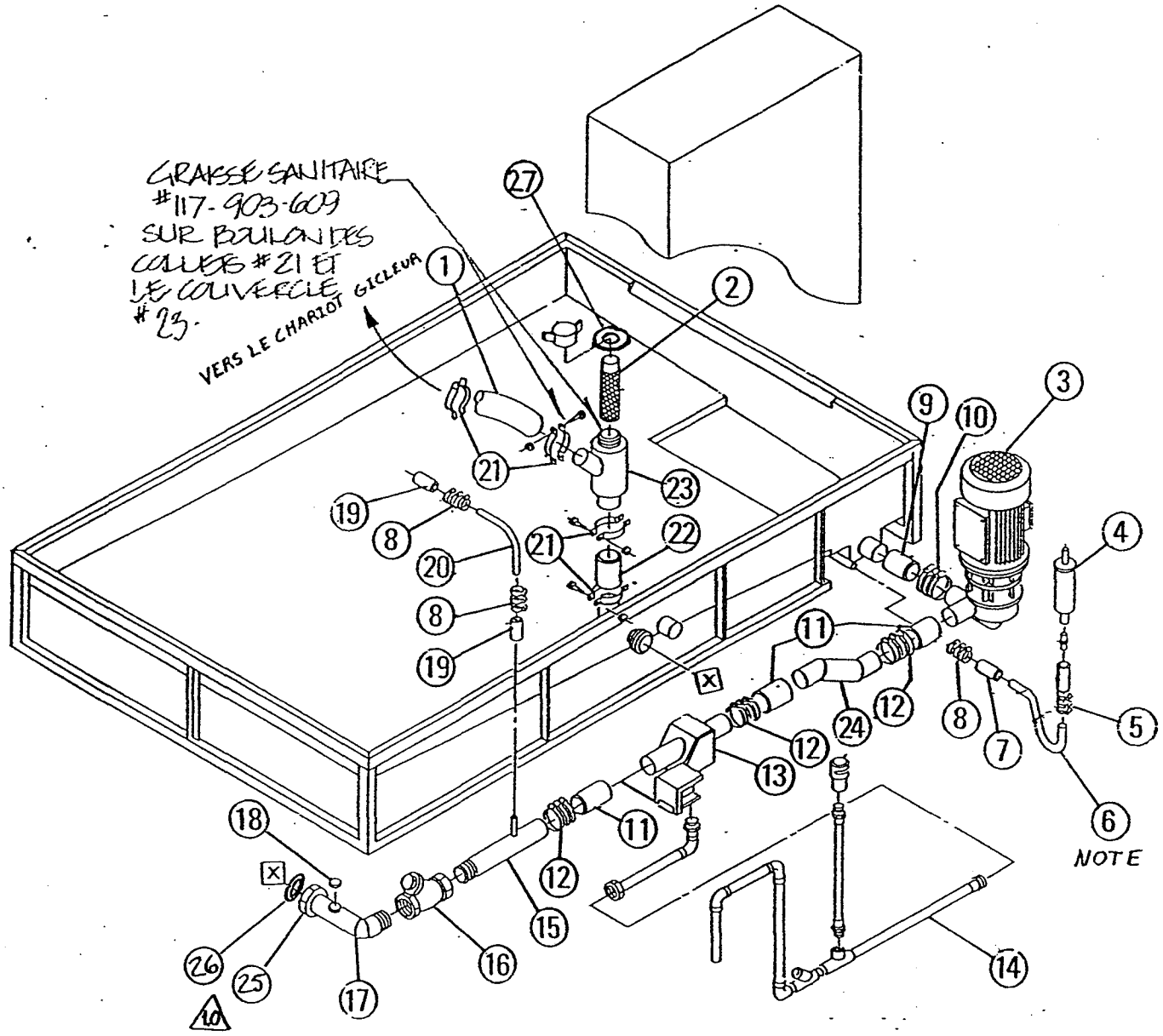


Figure 8-12. Water Circulation Piping Assembly

DESSIN NUMERO	MATERIEL



NOTE: VOIR DÉTAIL DE LA PIÈCE #6 (DESSIN 117-965-651) POUR UN 220-114".

TOLERANCES:

TOLERIE:
-dimension fractionnaire +/- 1/32"
-dimension decimale +/- .005"
-angle +/- 1°
SAUF SI INDIQUE AUTREMENT

SURFACE MACHINEE:
-dimension fractionnaire +/- 1/64"
-dimension decimale +/- .005"
-angle +/- 1°
SAUF SI INDIQUE AUTREMENT

NO	DATE	DESCRIPTION
0.1	99-01-28	DCT #2844 TC

REVISION

HOPLAB INC QUE. QUEBEC

Toutes les informations et les specifications sur ce dessin sont la propriete de HOPLAB INC.et doivent etre maintenues confidentielles, et nous etre retournees sur demande. Toute reproduction ou autre usage est interdit a moins d'autorisation ecrite de la compagnie HOPLAB INC.

TITRE: PLOMBERIE

120-220

HOPLAB	Des. TC. Date. 99-01-20	Echelle NIL	Ver. TC Date 99-01-28	Ver. AC Date. 99-02-01	Dessin no. 117-005-125	Dossier no. 1 DE 3

MATÉRIEL

ITEM	QTE	DESCRIPTION	MRP
1	1	BOYAU CHARIOT GICLEUR 2" X 8' VAPEUR	117-950-252
2	1	CARTOUCHE FILTRE GICLEUR 120,220	117-950-005
3	1	POMPE,MOTEUR ASS. 7.5HP 120,220	117-950-358
4	1	CONTROLE NIVEAU ELECTRODE LONG ASS.	117-950-024
5	2	COLLET A/I #6 3/8" X 7/8"	117-950-784
6	1	TUYAU DE NIVEAU D'EAU 120,220	117-952-785
7	1	BOYAU 3/4" X 2 1/4" VINYLE	117-955-232
8	9	COLLET A/I #10 9/16" 1 1/16"	117-950-785
9	1	BOYAU 2 1/2" X 2 1/4" NOIR	117-950-687
10	3	COLLET A/I #44 2 5/16" X 3 1/4"	117-950-790
11	3	BOYAU 2" X 2 1/4" NOIR	117-950-688
12	9	COLLET A/I #32 1 9/16" X 2 1/2"	117-950-673
13	1	VALVE 3 VOIES ASS.	117-950-223
14	1	DRAIN PRINCIPALE SI 120-220	117-952-791
	1	DRAIN PRINCIPALE SI 120-114"/220-114"	117-958-569
15	1	TUYAU SORTIE VALVE 3V SI 120-220	117-952-750
	1	TUYAU SORTIE VALVE 3V SI 120-114"/220-114"	117-958-577
16	1	VALVE DE RETENUE A BASCULE 1 1/2"F	117-950-219
17	1	TUYAU SORTIE VALVE ANTI-RETOUR	117-965-641
18	1	BOUCHON A/I 1"M	117-952-209
19	2	BOYAU 1/2" X 2 1/4" ROUGE	117-950-800
20	1	PRISE D'AIR 120,220 114"	117-902-642
21	4	COLLET DE GICLEUR ASS. 120,220	117-952-747
22	1	BOYAU CHARIOT GICLEUR 2" X 3 3/4"	117-951-122
23	1	FILTRE GICLEUR 120,220	117-906-155
24	1	TUYAU DE SORTIE DE POMPE 120,220	117-952-762
25	1	COLLET A DEMONTAGE RAPIDE 2"	117-950-808
26	1	ANNEAU ETANCHEITE 2", SILICONE	117-951-568
27	1	ETANCHEUR VITON 1/8" X 2-1/4"	117-951-027

STERIS

Corporation STERIS Canada

TOLÉRANCES

-Indice de rugosité: 63/
-Équerrage en diagonale: 1/16"
-Assemblage soudé: ± 1/32"
-Sciage: ± 1/32"
-Métal en feuille: fractions ± 1/32"
-Usinage: fractions ± 1/64"
-Décimale ± .005"
-Angle ± 1°

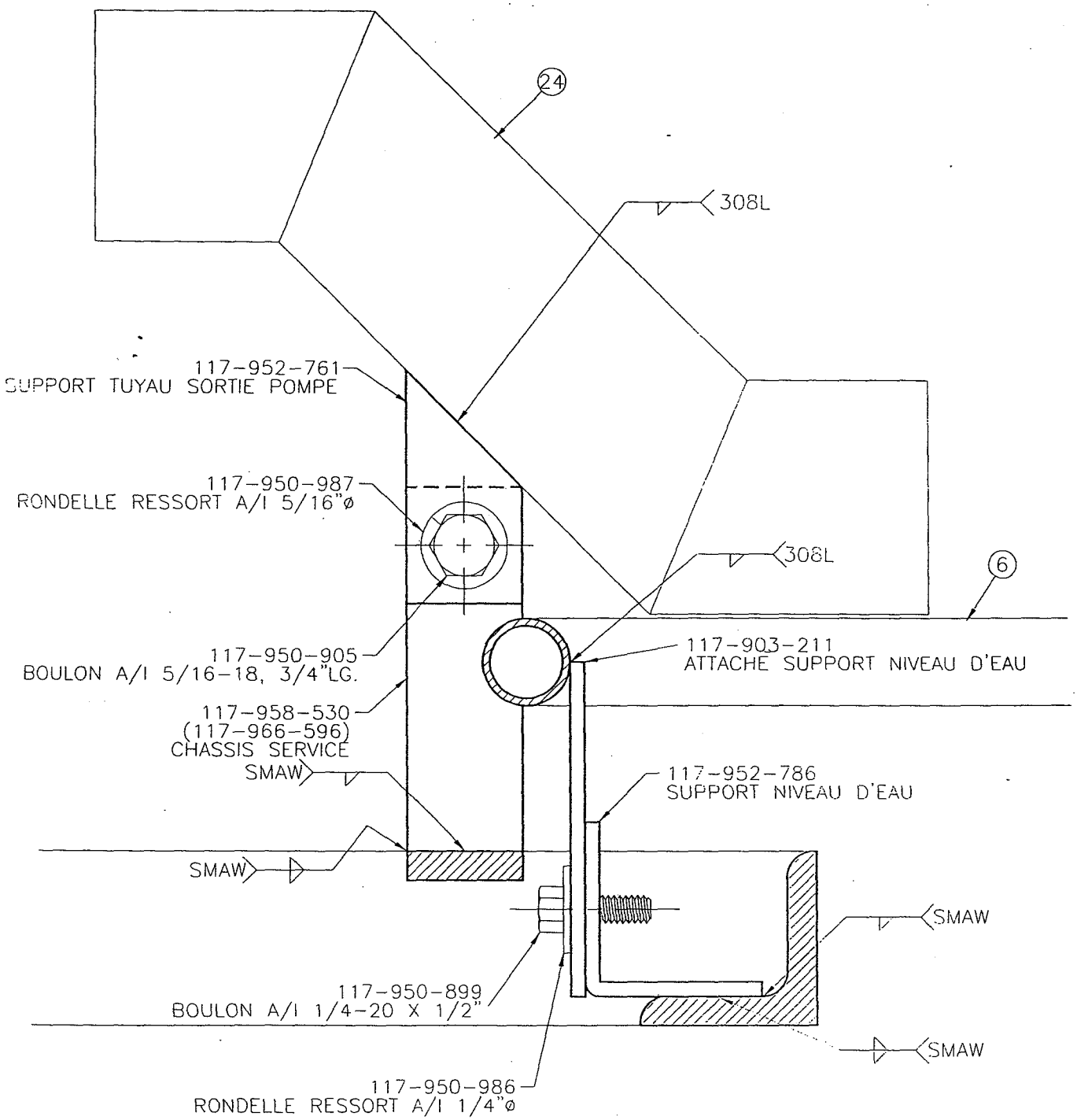
SAUF INDICATION CONTRAIRE

RÉVISION NO	DATE	DESCRIPTION	DES.
0.0	99-01-28	DCT. #2844	TC

TITRE: PLOMBERIE

Des. TC	Vér. TC	Appr. AC	Échelle non spécifiée	Numéro 117-005-125	Page 2 de 3
Date 99-01-28	Date 99-02-01	Date 99-02-01			

MATÉRIEL



NOTE: TOUTES LES SOUDURES SUR L'ACIER DEVRONT ETRE PEINTUREES (ALUMINIUM)

STERIS

Corporation STERIS Canada

TOLÉRANCES

- Indice de rugosité: 63
- Équerrage en diagonale: 1/16"
- Assemblage soudé: ± 1/32"
- Sciage: ± 1/32"
- Métal en feuille: fractions ± 1/32"
- Usinage: fractions ± 1/64"
- Décimale ± .005"
- Angle ± 1°

SAUF INDICATION CONTRAIRE

RÉVISION NO	DATE	DESCRIPTION	DES.
0.0	99-01-28	DCT. #2844	TC

TITRE: PLOMBERIE

Dess. TC	Vér. TC	Appr. AC	Échelle non spécifiée	Numéro 117-005-125	Page 3 de 3
Date 99-01-28	Date 99-02-01	Date 99-02-01			

FIG. & INDEX NO.	PART NUMBER			SVC	DESCRIPTION	UNITS PER ASSEMBLY
8-12					WATER CIRCULATION PIPING ASSEMBLY	X
1	P	117950	252		HOSE, Travelling Spray Manifold	1
2	P	117950	005		SCREEN, Filter, Travelling Spray Manifold Hose	1
3	P	117950	358		ASSEMBLY, Pump Motor (7-1/2 HP) and Base (see Figure 8-13)	1
4	P	117950	024		CONTROL, Chamber Water Level	1
5	P	117951	024		INSULATOR, Water Level Control	1
6	P	117950	692		HOSE, 1/2 Dia. x 2-1/4	2
7	P	117950	783		CLAMP, Stainless Steel, #4, 3/8	6
8	P	117950	223		VALVE, Solenoid, Diverter Drain (see Figure 8-15)	1
	P	117950	226		• KIT, Repair	A/R
	P	117950	172		• SOLENOID	A/R
9	P	117950	219		VALVE, Check Swing, 1-1/2	1
10	P	117950	215		BREAKER, Vacuum, 1/2	1
11	P	117950	354		VALVE, Check Swing, 1	1
12	P	117950	800		HOSE, 1/2" ID	2
13	P	117950	785		CLAMP #10	6
14	P	117952	747		CLAMP, Reinforced, 2-5/8"	4
15	P	117952	746		ASSEMBLY, Filter	1
16	P	117950	688		HOSE, 2" ID x 2-1/4" Lg.	3
17	P	117950	673		CLAMP #32	9
18	P	117950	687		HOSE, 2-1/4" ID x 2-1/4" Lg.	1
19	P	117950	790		CLAMP #44	3
20	P	117952	209		PLUG, Pipe, Hex. Hd. 1" NPT	1
21	P	117951	122		HOSE, Reinforced, 2" ID x 3-3/4" Lg.	1

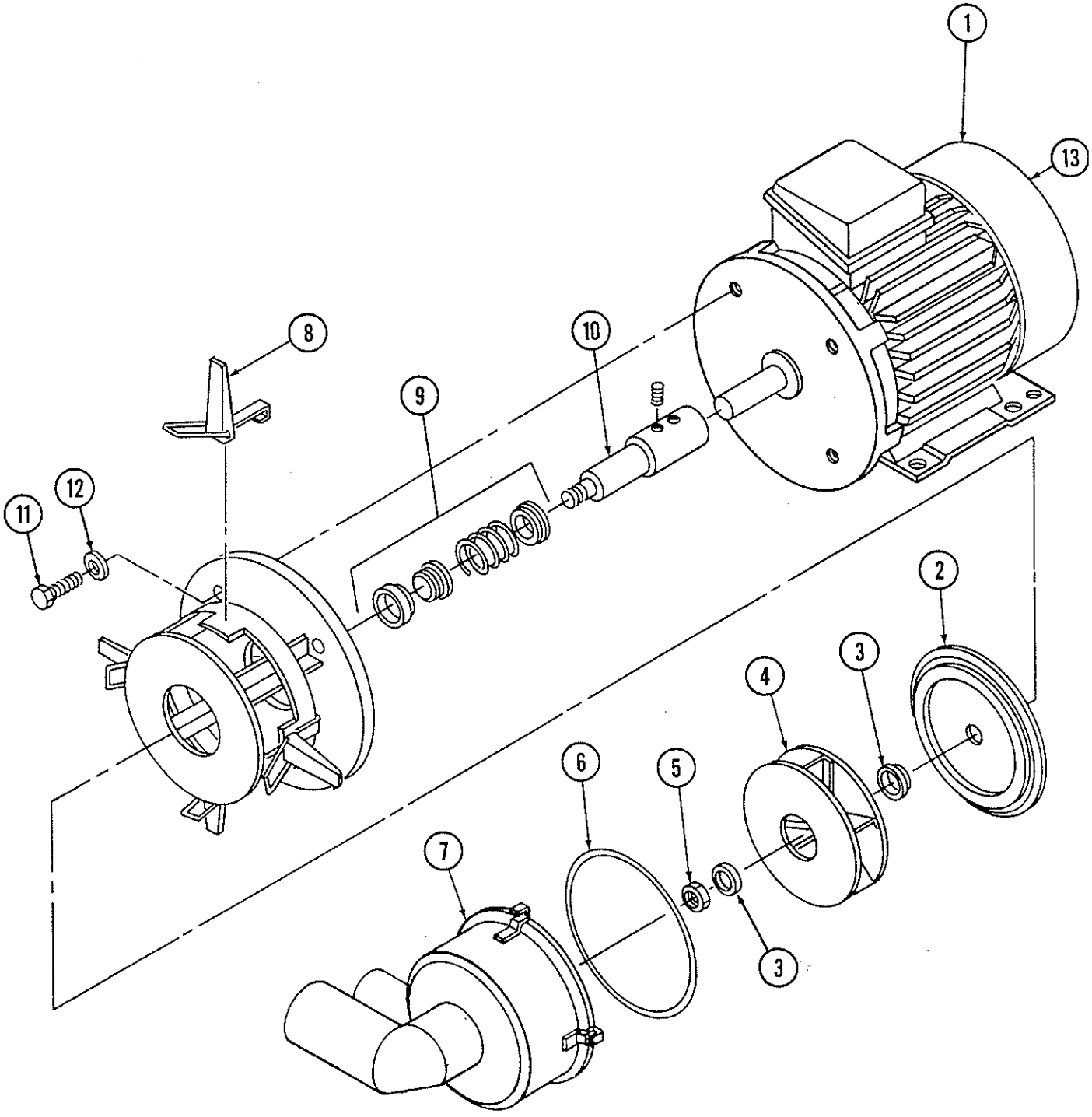


Figure 8-13. Pump and Motor Assembly

FIG. & INDEX NO.	PART NUMBER			SVC	DESCRIPTION	UNITS PER ASSEMBLY
8-13	P	117950	358		PUMP AND MOTOR ASSEMBLY	X
1	P	117950	131		MOTOR, 7-1/2 HP, AC (Specify Voltage)	1
2	P	117950	144		FLANGE, Sealing	1
3	P	117950	157		WASHER, Flange, Shaft	2
4	P	117950	160		IMPELLER, Squirrel Cage	1
5	P	117950	158		NUT, 3/4-16, LH Thread, Stainless Steel	1
6	P	117950	145		O-RING, Pump Cover	1
7	P	117950	150		COVER, Pump	1
8	P	117950	151		CLIP, Pump Cover	4
9	P	117950	142		ASSEMBLY, Seal, Pump Shaft (Before S/N 3617990XXX)	1
	P	117951	518		ASSEMBLY, Seal, Pump Shaft (From S/N 3617990XXX)	1
10	P	117951	442		SHAFT, Pump Impeller (Before S/N 3617990XXX)	1
	P	117951	513		SHAFT, Pump Impeller (From S/N 3617990XXX)	1
11	P	117954	141		BOLT, Hex. Hd. 1/2-13 x 3/4" Lg.	4
12	P	117950	989		WASHER, Lock 1/2"	4
13	P	117951	741		FAN, 7.5 HP Motor	1

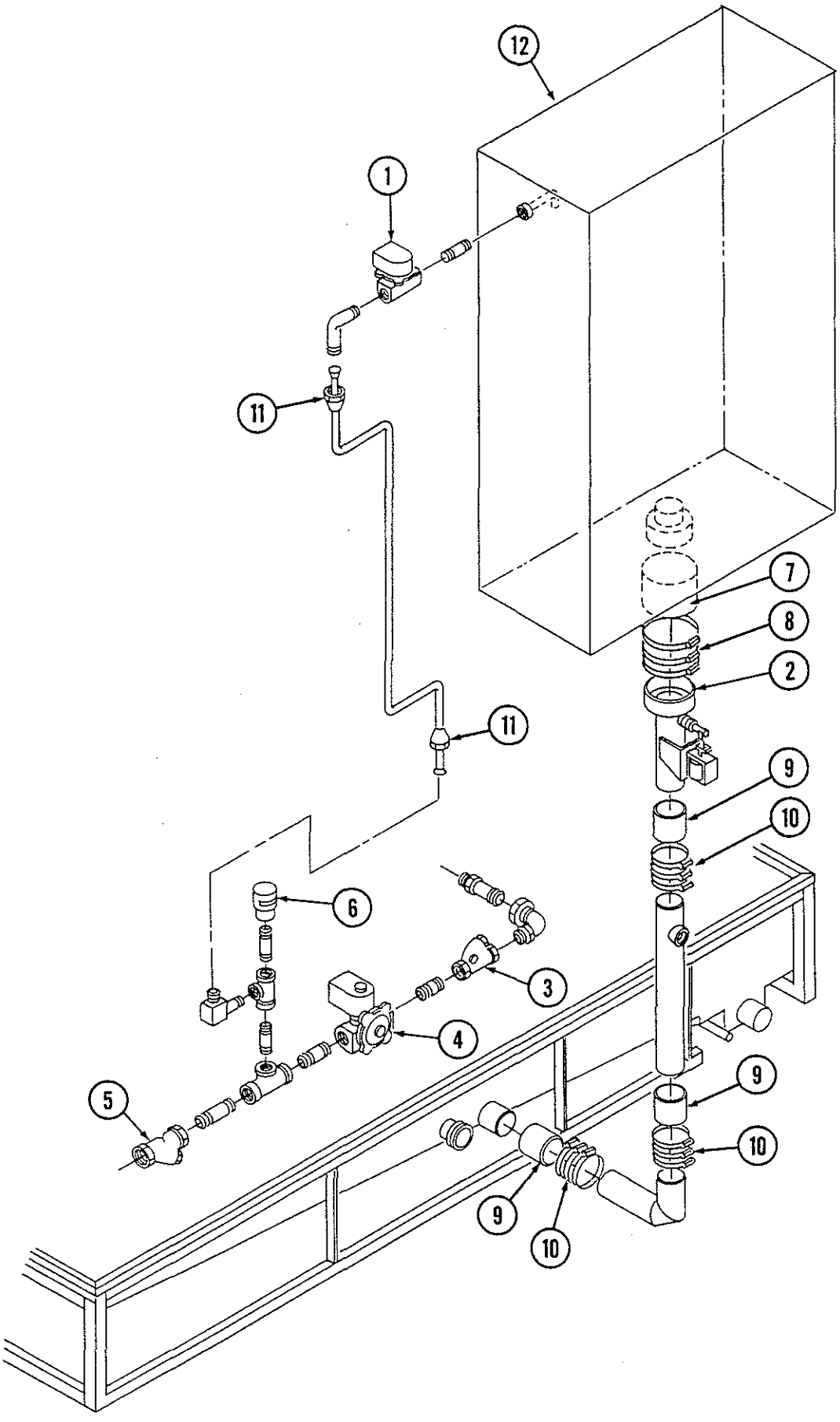


Figure 8-14. Hot Water Supply Piping Assembly (Optional Water Temperature Booster Tank)

FIG. & INDEX NO.	PART NUMBER			SVC	DESCRIPTION	UNITS PER ASSEMBLY
8-14					HOT WATER SUPPLY PIPING ASSEMBLY (with Optional Water Temperature Booster Tank)	X
1	P	117950	173		VALVE, Solenoid, Hot Water, 1/2 NPT	1
	P	117950	174		• KIT, Repair	A/R
	P	117950	175		• SOLENOID	A/R
2	P	117950	171		VALVE, Solenoid, 180°F (82°C) Water, 2-1/2 (see Figure 8-16)	1
	P	117950	167		• KIT, Spring	A/R
	P	117950	168		• KIT, Seal	A/R
	P	117950	172		• SOLENOID	A/R
3	P	117950	217		VALVE, Check Swing, 1	1
4	P	117950	209		VALVE, Solenoid, Hot Water, 1 NPT	1
	P	117950	212		• KIT, Repair	A/R
	P	117950	175		SOLENOID	A/R
5	P	117950	205		STRAINER, Hot Water, 1	1
	P	117950	206		• SCREEN	A/R
6	P	117950	215		BREAKER, Vacuum, 1/2	1
7	P	117950	686		HOSE, 4" ID X 2-1/4" Lg.	1
8	P	117950	792		CLAMP #64	3
9	P	117950	687		HOSE, 2-1/2" ID X 2-1/4" Lg.	3
10	P	117950	790		CLAMP #44	9
11	P	117950	974		NUT, Flare, Copper, 1/2"	2

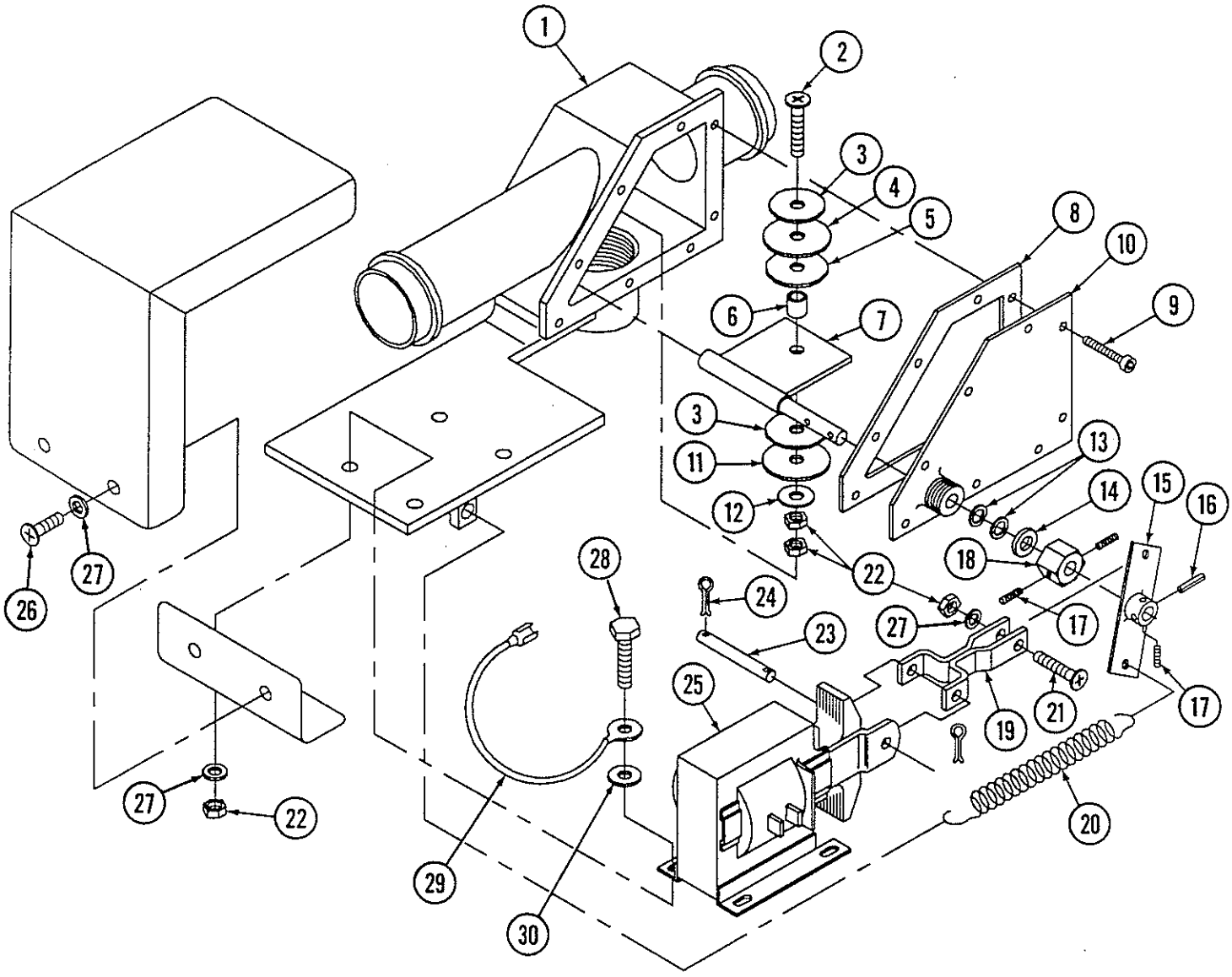


Figure 8-15. Diverter Drain Valve Assembly

FIG. & INDEX NO.	PART NUMBER			SVC	DESCRIPTION	UNITS PER ASSEMBLY			
8-15	P	117950	223		DIVERTER DRAIN VALVE	X			
	P	117950	224		DIVERTER DRAIN VALVE (Optional Manifold Cart System)		X		
1					HOUSING, Valve	1	1		
2	P	117950	869		SCREW, #10-32 x 1", S/S	1	1		
3	P	117951	419		WASHER, 1-1/2" OD	1	1		
4	P	117951	027		GASKET, 2-1/4" OD	1	1		
5	P	117951	420		WASHER, 2-1/8" OD	1	1		
6	P	117951	418		BUSHING	1	1		
7	P	117950	672		ASSEMBLY, Pilot (with Gasket)	1			
	P	117950	671		ASSEMBLY, Pilot (with Gasket)		1		
8	P	117951	029		GASKET, Cover		1		
9	P	117951	415		SCREW, Sockethead, #10-32	8	8		
10					COVER, Valve Housing	1	1		
11	P	117951	018		SEAL, 1-7/8" OD	1			
12	P	117951	422		WASHER, 1" OD	1			
13	P	117951	028		O-RING	2	2		
14	P	117951	190		WASHER, Copper, Seal Press	1	1		
15	P	117951	416		LEVER, Spring	1	1		
16	P	117950	814		PIN, Spring	1	1		
17	P	117951	414		SCREW, Set, #10-32 x 1/4, S/S	3	3		
18	P	117951	417		NUT, Packing	1	1		
19	P	117950	703		LINK, Connecting	1			
					LINK, UC Valve		1		
20	P	117951	030		SPRING, Solenoid	1	1		
21	P	117950	867		SCREW, #10-32	3	3		
22	P	117950	951		NUT, #10-32	11	11		
23	P	117951	011		PIN, Solenoid, 3/16" OD	1			
					PIN, Solenoid, 1/4" OD		1		
24	P	117951	016		PIN, Cotter	2	2		
25	P	117950	172		SOLENOID, Intermittent Duty	1			
	P	117950	228		SOLENOID, Continuous Duty		1		
	P	117950	226		KIT, Valve Repair	A/R			
	P	117950	227		KIT, Valve Repair		A/R		
26	P	117950	857		SCREW, Rd. Hd.,#8-32 x 1/2" Lg.	2	2		
27	P	117950	985		WASHER, Lock, 3/16"	7	7		
28	P	117950	896		BOLT, Hex. Hd. #10-32 x 3/4" Lg.	4	4		
29	P	117950	263		WIRE, Tew, Green, #14	1	1		
30	P	117950	975		WASHER, Flat, 3/16"	4	4		

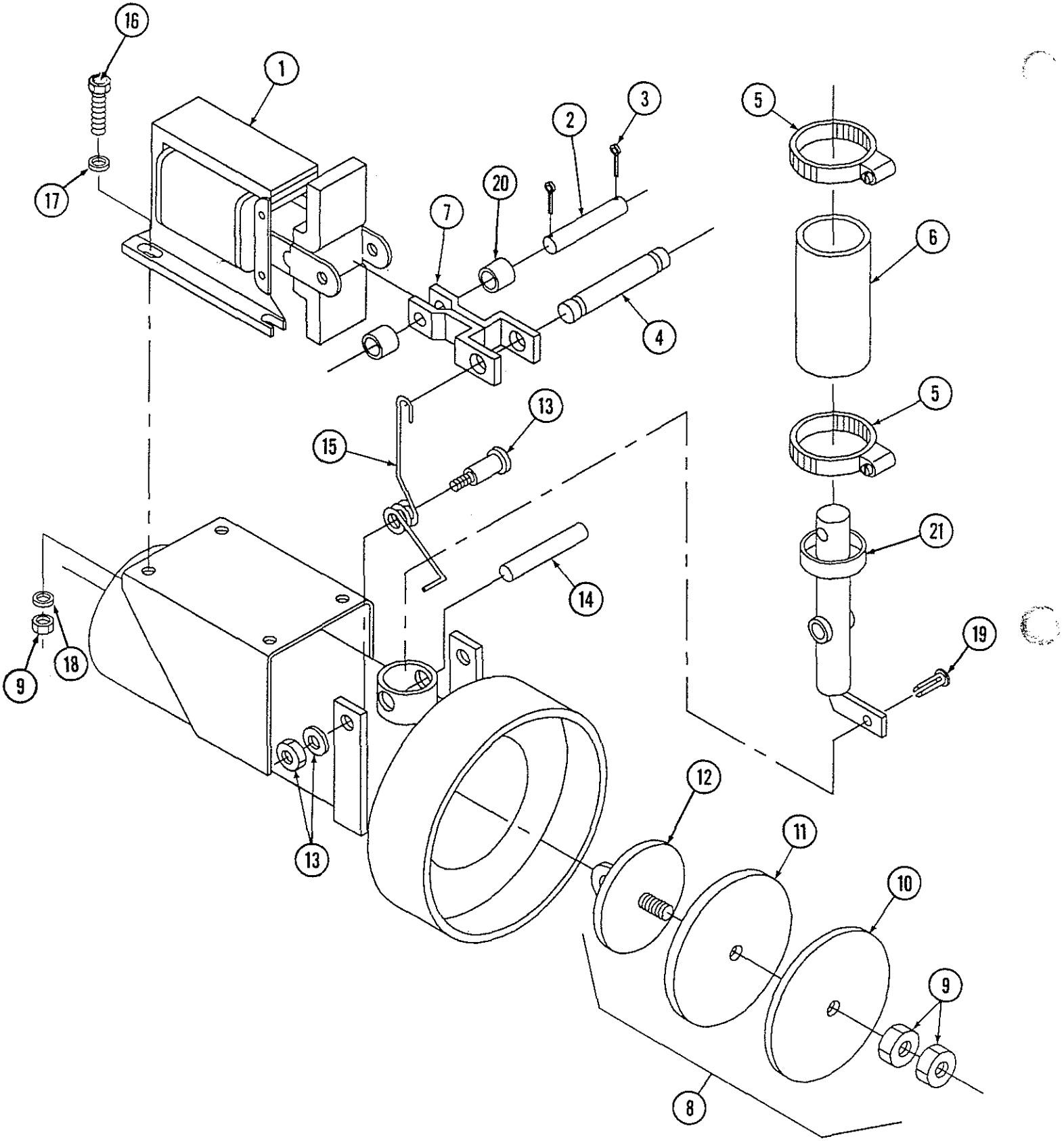


Figure 8-16. 2-1/2" Solenoid Valve Assembly (Optional Water Temperature Booster Tank)

FIG. & INDEX NO.	PART NUMBER			SVC	DESCRIPTION	UNITS PER ASSEMBLY
8-16	P	117950	171		2-1/2" SOLENOID VALVE ASSEMBLY, Optional Water Temperature Booster Tank	X
1	P	117950	172		SOLENOID, Intermittent Duty	1
2	P	117951	011		PIN, Solenoid	1
3	P	117951	016		PIN, Cotter	2
4	P	117951	014		PIN, Spring Lever	1
5	P	117950	786		CLAMP	2
6	P	117950	690		HOSE	1
7	P	117951	259		LINK, Connecting	1
8	P	117950	679		ASSEMBLY, Seal	1
9	P	117950	951		• NUT, 10-32, S/S	6
10	P	117951	022		• WASHER	1
11	P	117951	026		• SEAL, Viton	1
	P	117950	168		• KIT, Repair	A/R
12	P	117954	327		• SUPPORT, Seal	1
13	P	117950	425		SLEEVE, Spring (with Washer and Nuts)	1
14	P	117951	013		PIN	1
15	P	117950	167		SPRING, Valve (Set of 2)	1
16	P	117950	896		BOLT, Hex. Hd. #10-32 x 3/4" Lg.	4
17	P	117950	975		WASHER, Flat	4
18	P	117950	985		WASHER, Lock	4
19	P	117953	986		RIVET	1
20	P	117957	658		SPACER, Tube	2
21	P	117954	332		ARM, Pivot	1

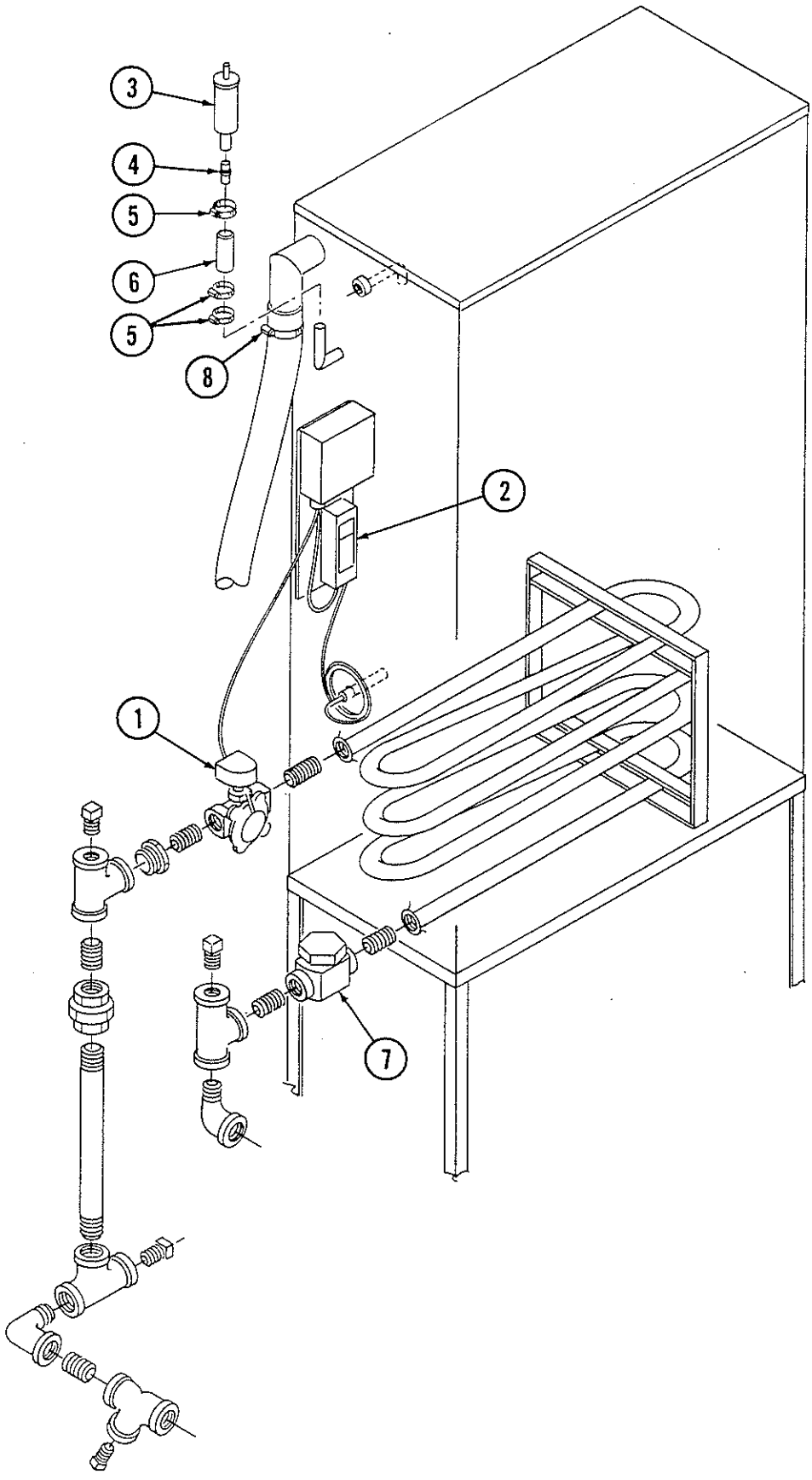


Figure 8-17. Steam Piping Assembly (Optional Water Temperature Booster Tank)

FIG. & INDEX NO.	PART NUMBER			SVC	DESCRIPTION	UNITS PER ASSEMBLY
8-17					STEAM PIPING ASSEMBLY Optional Water Temperature Booster Tank	X
1	P	117950	999		VALVE, Solenoid, Steam, 1" NPT	1
	P	117951	000		• KIT, Repair	A/R
	P	117950	191		• SOLENOID	A/R
2	P	117950	184		THERMOSTAT	1
3	P	117950	025		CONTROL, Tank Water Level	1
4	P	117951	024		INSULATOR, Water Level Control	1
5	P	117950	783		CLAMP #4, Stainless Steel	3
6	P	117950	692		HOSE, 1/2 x 2-1/4"	1
7	P	117950	198		TRAP, Steam, 1"	1
	P	117950	176		SWITCH, Pressure, (not shown)*	1
8	P	117950	790		CLAMP #44	1
9	P	117952	307		HOSE, Vinyl, Reinforced (in feet)	6
	P	117959	214		HOSE, Trico, 3/16" ID (used w/pressure switch — in feet)	

* Upgrade kit #117951-756

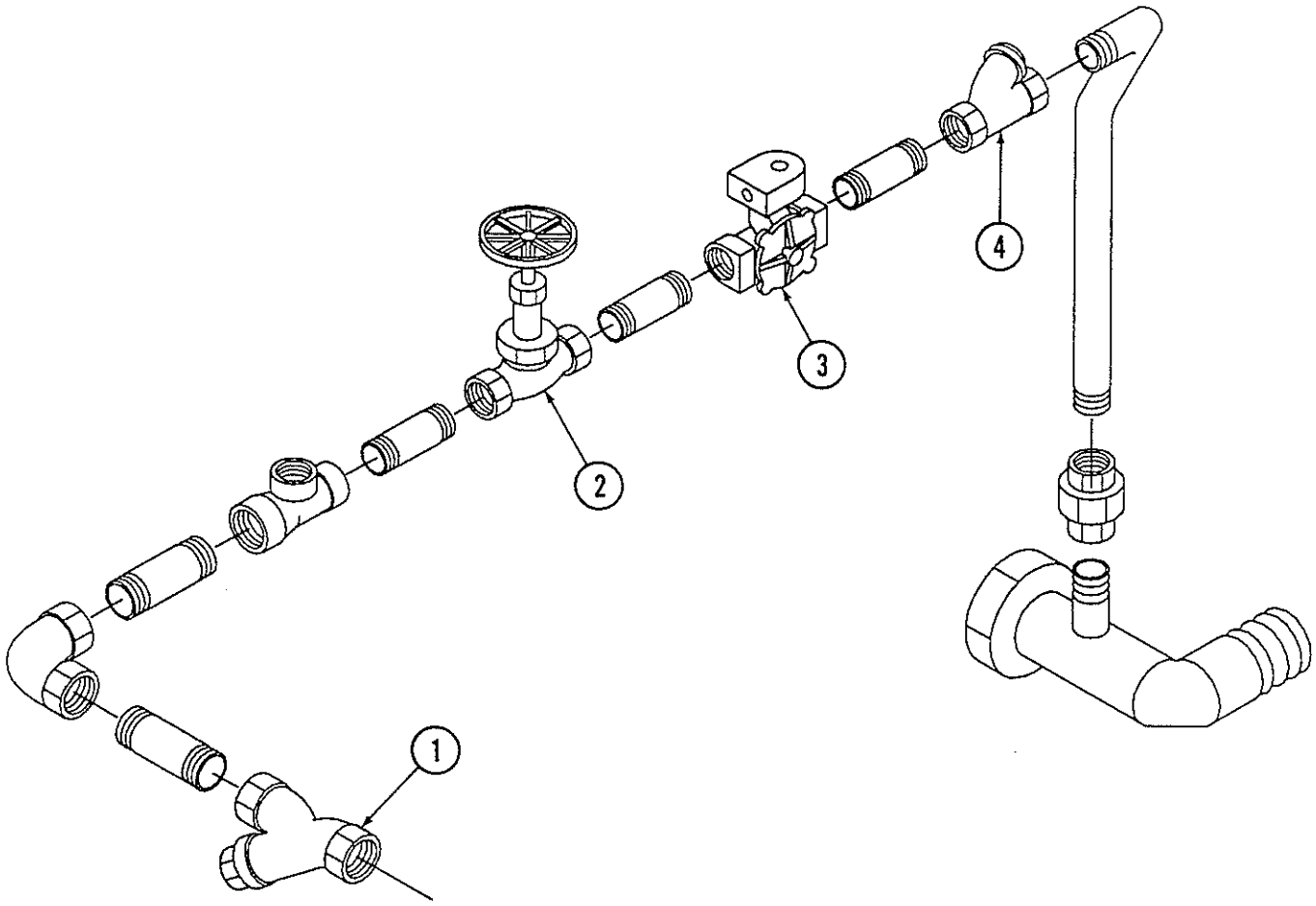


Figure 8-18. Steam Piping Assembly (Optional Steam Injection)

FIG. & INDEX NO.	PART NUMBER			SVC	DESCRIPTION	UNITS PER ASSEMBLY
8-18					STEAM PIPING ASSEMBLY, Optional Steam Injection	X
1	P	117950	192		STRAINER, Steam, 1-1/2"	1
2	P	117950	220		VALVE, Globe, 1"	1
3	P	117950	999		VALVE, Solenoid, Steam, 1" NPT	1
	P	117951	000		• KIT, Repair	A/R
	P	117950	191		• SOLENOID	A/R
4	P	117950	218		VALVE, Check Lift, 1"	1

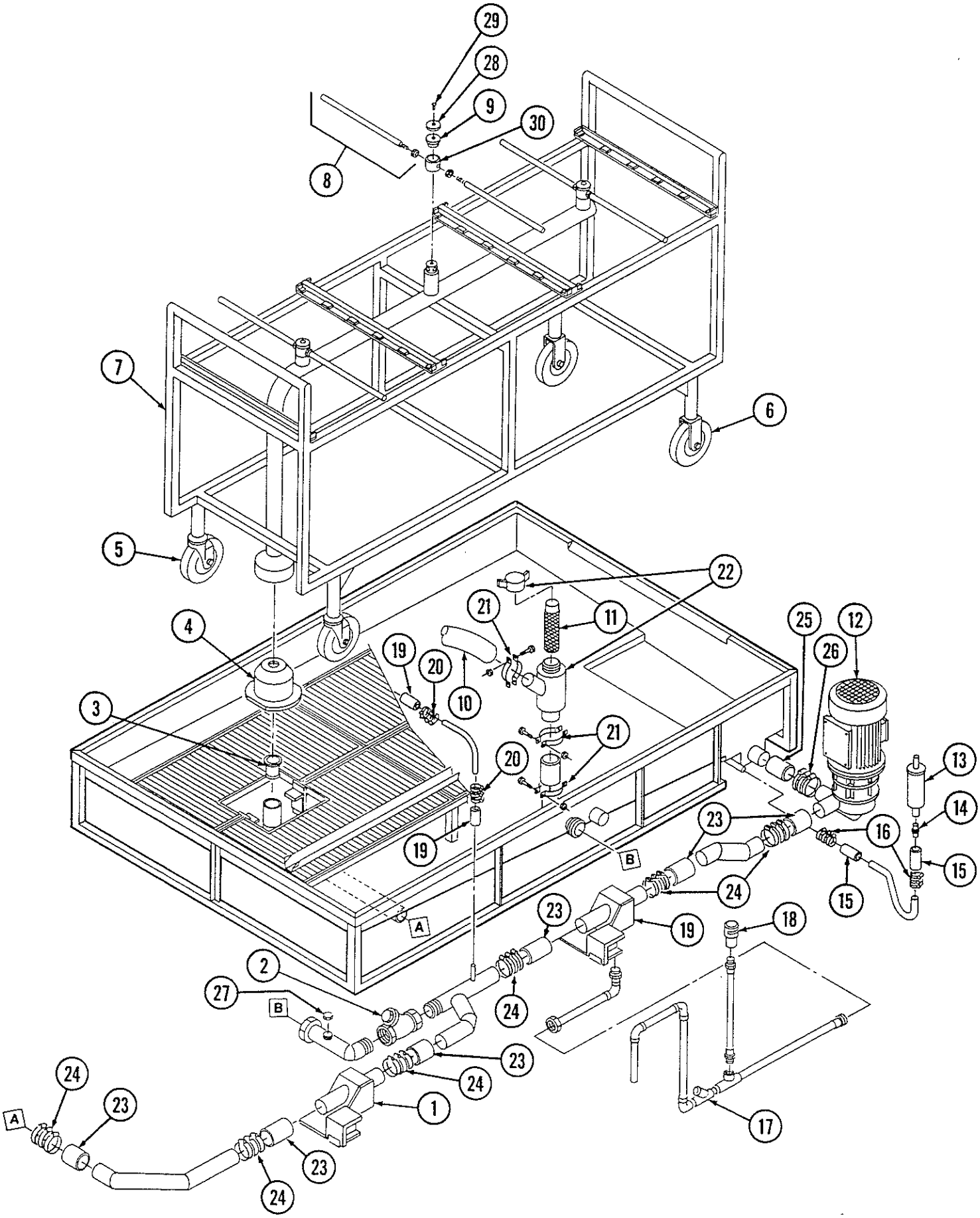


Figure 8-19. Water Circulation Piping Assembly (Units with Optional Manifold Cart System)

FIG. & INDEX NO.	PART NUMBER			SVC	DESCRIPTION	UNITS PER ASSEMBLY
8-19					WATER CIRCULATION PIPING ASSEMBLY Units with Optional Manifold Cart System	X
1	P	117950	224		VALVE, Solenoid (see Figure 8-15)	1
	P	117950	227		• KIT, Repair	A/R
	P	117950	228		• *SOLENOID*	A/R
2	P	117950	219		VALVE, Check Swing, 1-1/2"	1
3	P	117950	030		FILTER, Manifold Cart Coupler	1
4	P	117951	469		CONNECTOR, Manifold Cart. (before S/N 3603791171)	1
	P	117951	624		CONNECTOR, Coupling (after S/N 3603791171)	1
	P	117951	625		• GASKET (after S/N 3603791171)	1
5	P	117950	487		WHEEL, Manifold Cart, Swivel	2
6	P	117950	488		WHEEL, Manifold Cart, Fixed	2
7					CART, Manifold Utensil	1
8	P	117950	484		ARM, Rotary Spray (with Nuts)	6
9	P	117951	023		BUSHING, Rotary Spray	3
10	P	117950	252		HOSE, Travelling Spray Manifold	1
11	P	117950	005		SCREEN, Filter, Travelling Spray Manifold Hose	1
12	P	117950	135		ASSEMBLY, Pump Motor (7-1/2 HP) and Base (see Figure 8-13)	1
	P	117950	358		ASSEMBLY, Pump Motor (7-1/2 HP) and Base, (from 3682108xxx)	1
13	P	117950	024		CONTROL, Chamber Water Level	1
14	P	117951	024		INSULATOR, Water Level Control	1
15	P	117950	692		HOSE, 1/2" x 2-1/4" Lg.	2
16	P	117950	783		CLAMP #4, 3/8", Stainless Steel	6
17	P	117950	217		VALVE, Check Swing, 1"	1
18	P	117950	215		BREAKER, Vacuum, 1/2"	1
	P	117951	541		BREAKER, Vacuum, 1/2", (from 3624890161)	1
19	P	117950	223		VALVE, Solenoid, Diverter Drain (see Figure 8-15)	1
	P	117950	226		• *KIT, Repair*	A/R
	P	117950	172		• SOLENOID	A/R
	P	117950	800		HOSE, 1/2" ID	2
20	P	117950	785		CLAMP #10	6
21	P	117952	747		CLAMP, Reinforced, 2-5/8"	4
22	P	117952	746		ASSEMBLY, Filter	1
23	P	117950	688		HOSE, 2" ID x 2-1/4" Lg.	6
24	P	117950	673		CLAMP #32	18
25	P	117950	687		HOSE, 2-1/4" ID x 2-1/4" Lg.	1
26	P	117950	790		CLAMP #44	3
27	P	117952	209		PLUG, Pipe, Hex. Hd., 1" NPT	1
28	P	117951	421		CAP, Retainer, 1-3/4" Dia.	3
29	P	117950	866		SCREW, Rd. Hd., #10-32 x 3/8" Lg.	3
30	P	117950	020		HUB, Rotary Spray Arm	3

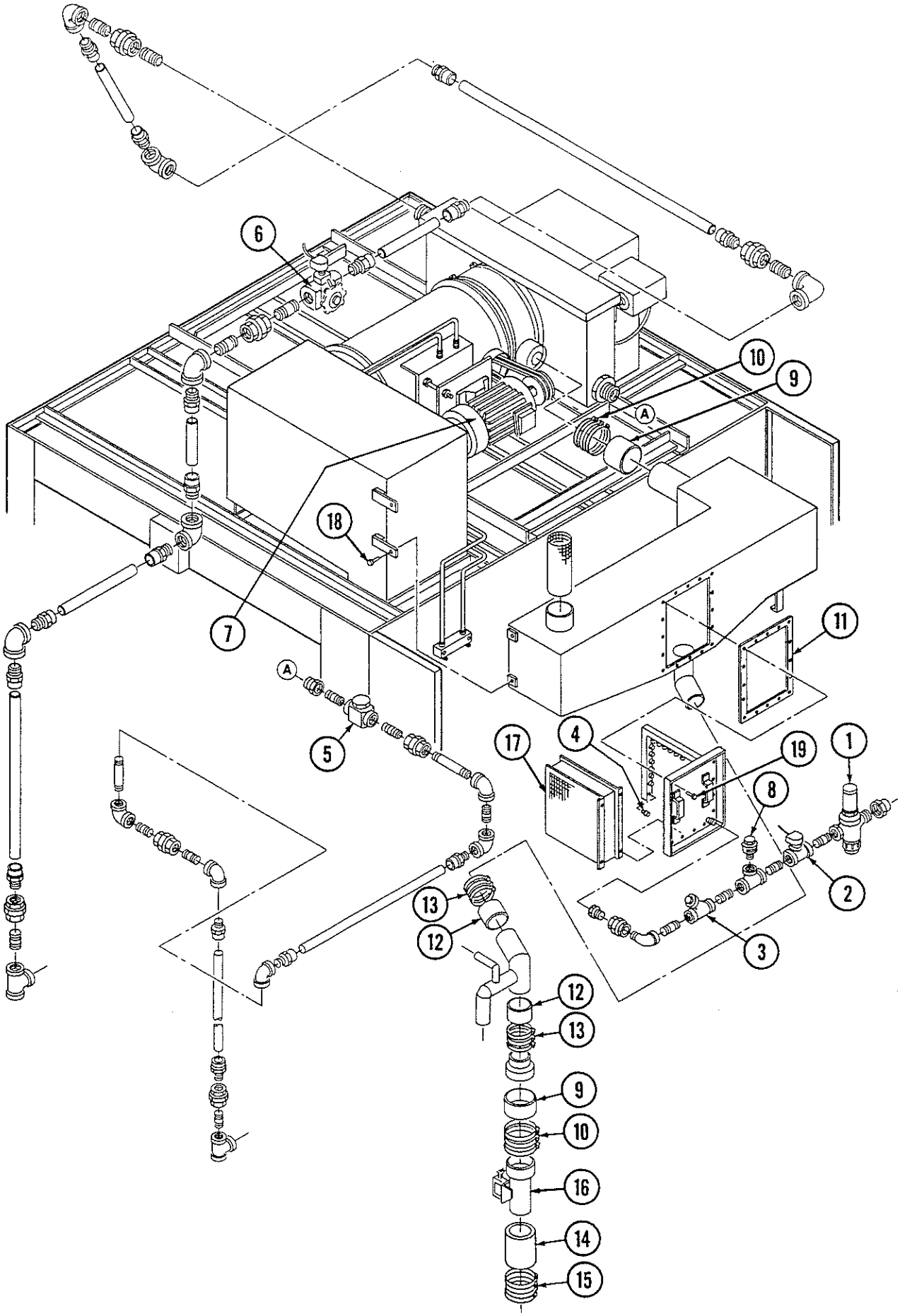


Figure 8-20. Optional Non-vented Drying Piping Assembly

FIG. & INDEX NO.	PART NUMBER			SVC	DESCRIPTION	UNITS PER ASSEMBLY
8-20					OPTIONAL NON-VENTED DRYING PIPING ASSEMBLY	X
1	P	117951	215		REGULATOR, Pressure	1
2	P	117950	173		VALVE, Solenoid, Cold Water, 1/2" NPT	1
	P	117950	174		• KIT, Repair	A/R
	P	117950	175		• SOLENOID	A/R
3	P	117950	216		VALVE, Check Swing, 1/2"	1
4	P	117950	613		NOZZLE, Spray, Condenser	A/R
5	P	117950	198		TRAP, Steam	1
6	P	117950	997		VALVE, Solenoid, Steam, 1-1/2" NPT	1
	P	117950	998		• KIT, Repair	A/R
	P	117950	480		• SOLENOID	A/R
7	P	117950	696		MOTOR, Fan, 5 HP, 3 Phase (see Figure 8-22)	1
8	P	117950	215		BREAKER, Vacuum, 1/2" (before S/N 3624890XXX)	1
	P	117951	541		BREAKER, Vacuum, 1/2" (from S/N 3624890XXX)	1
9	P	117950	686		HOSE, 4" x 2-1/4" Lg.	2
10	P	117950	792		CLAMP #64	6
11	P	117901	673		GASKET, Condenser, Kit	1
12	P	117950	667		HOSE, 3" x 2-1/4" Lg.	2
13	P	117950	791		CLAMP #52	6
14	P	117950	687		HOSE, 2-1/2" x 2-1/4" Lg.	1
15	P	117950	790		CLAMP #44	3
	P	117951	457		GREASE, Blower	A/R
16	P	117950	171		ASSEMBLY, Valve, 2-1/2" Solenoid (see Figure 8-16)	1
17	P	117950	623		FILTER, Condenser	1
18	P	117950	899		BOLT, Hex. Hd. 1/4-20 x 1/2" Lg.	2
19	P	117950	901		BOLT, Hex. Hd. 1/4-20 x 1" Lg.	16

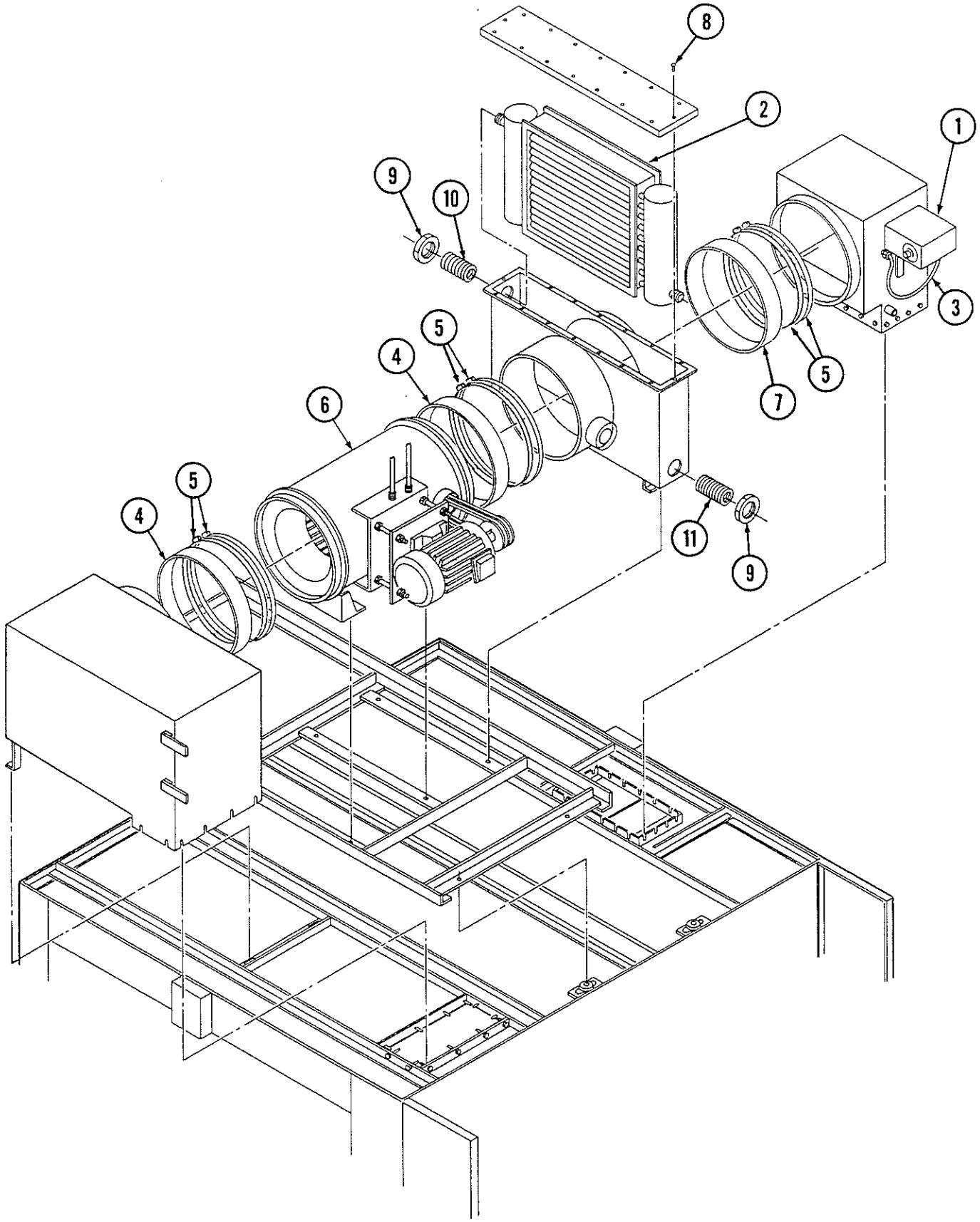


Figure 8-21. Optional Vented Drying Package Assembly

FIG. & INDEX NO.		PART NUMBER		S V C	DESCRIPTION	UNITS PER ASSEMBLY
8-21					OPTIONAL VENTED DRYING PACKAGE ASSEMBLY	X
1					THERMOSTAT, Viconics (see Figure 8-23)	1
2	P	117950	715		EXCHANGER, Heat	1
3	P	117950	755		THERMOCOUPLE	1
4	P	117951	444		JOINT, Duct, Neoprene, 3" Wide	2
5	P	117951	443		CLAMP, Duct	6
6					ASSEMBLY, Dryer Blower (see Figure 8-22)	1
7	P	117952	896		JOINT, Duct, Neoprene, 2-1/4" Wide	1
8	P	117950	899		BOLT, Hex. Hd. 1/4-20 x 1/2" Lg.	16
9	P	117958	465		NUT, 2-1/2"	2
10	P	117958	466		NIPPLE, Inlet	1
11	P	117958	467		NIPPLE, Outlet	1

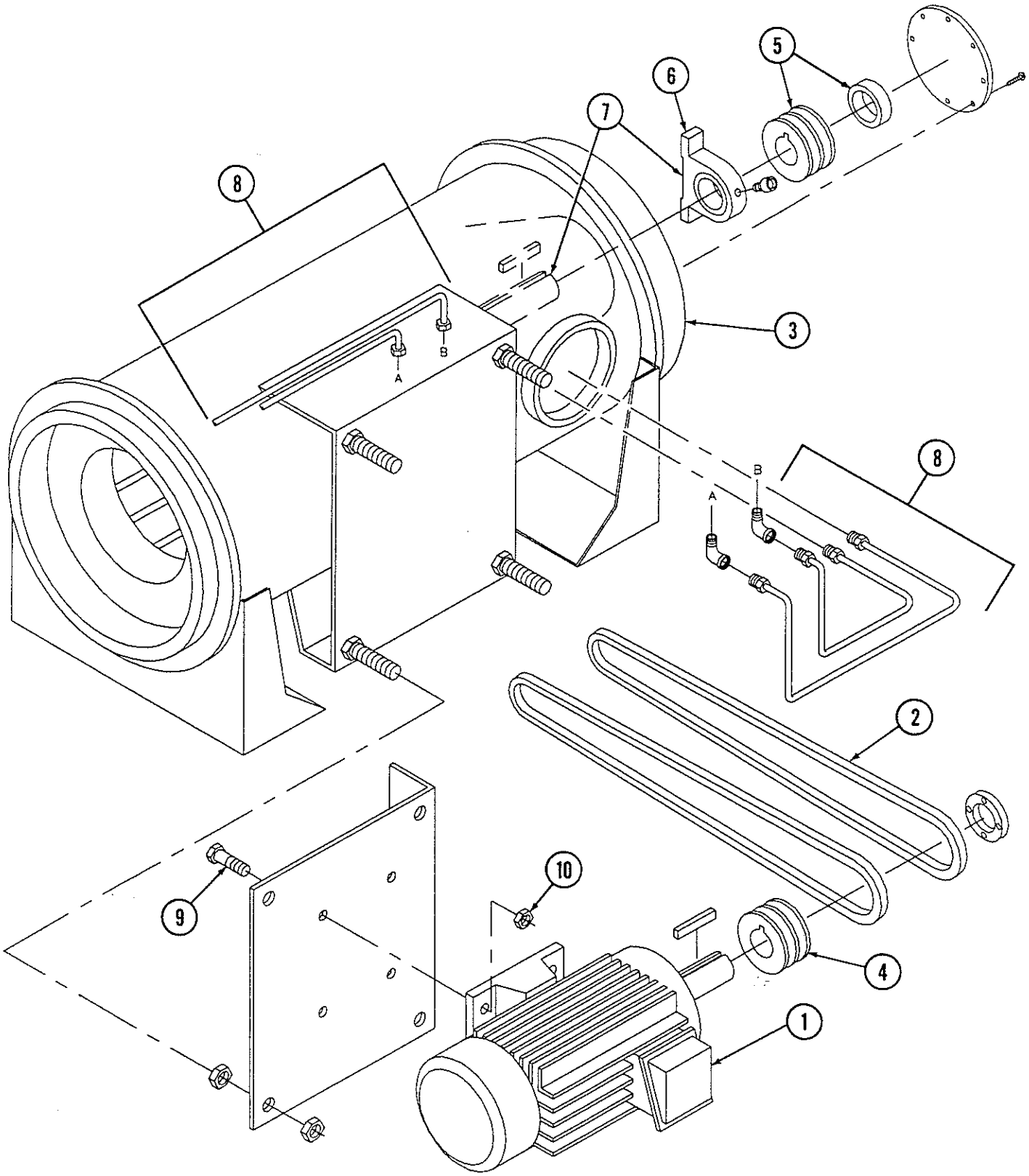


Figure 8-22. Dryer Blower Assembly (Units with Optional Drying Package)

FIG. & INDEX NO.	PART NUMBER			SVC	DESCRIPTION	UNITS PER ASSEMBLY
8-22					DRYER BLOWER ASSEMBLY (Units with Optional Drying)	X
1	P	117950	696		MOTOR, Fan, 5 HP, 208, 240, 480 V, 3 Phase	1
	P	117950	697		MOTOR, Fan, 5 HP, 600 V, 3 Phase	1
2	P	117950	713		BELT, Fan	2
3	P	117951	455		FAN, Axial (with Motor)	1
	P	117951	456		FAN, Axial (without Motor)	1
4	P	117950	714		PULLEY, 3-1/2" dia.	1
5	P	117951	498		PULLEY, 3" dia. (Hub 1)	1
6	P	117902	147		BLOCK, Pillow, (from Dec. 1989)	2
	P	117951	095		BLOCK, Pillow, For Canada Fan, (before Dec. 1989)	
7	P	117951	607		KIT, Shaft & Bearing Assembly	1
8	P	117951	457		TUBE, Grease (not shown)	
9	P	117950	935		BOLT, Hex. Hd. 3/8-16 x 1/4" Lg.	4
10	P	117950	955		NUT, 3/8-16	4
11	P	117951	485		KIT, Pillow Block Bearing (not shown)	

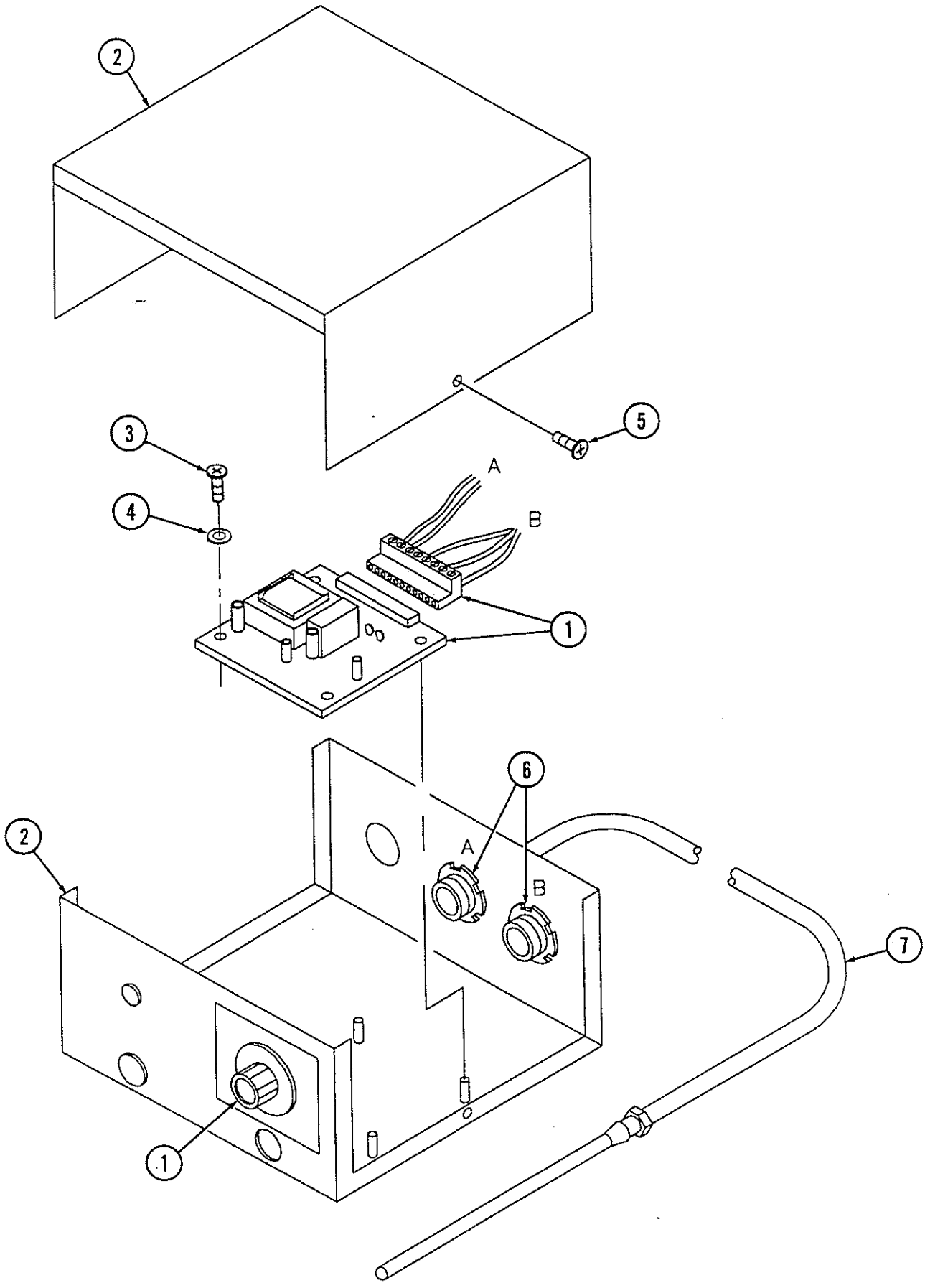


Figure 8-23. Dryer Thermostat (Units with Optional Drying Package)

FIG. & INDEX NO.	PART NUMBER			SVC	DESCRIPTION	UNITS PER ASSEMBLY
8-23					DRYER THERMOSTAT (Units with Optional Drying Package)	X
1	P	117951	328		THERMOSTAT, Viconics	1
2	P	117954	269		BOX, Thermostat	1
3	P	117950	856		SCREW, Rd. Hd., #8-32 x 3/8" Lg.	4
4	P	117950	985		WASHER, Lock, 3/16"	4
5	P	117950	850		SCREW, Rd. Hd., #6-32 x 3/8" Lg.	1
6	P	117953	857		CONNECTOR, Straight	2
7	P	117950	755		THERMOCOUPLE	1

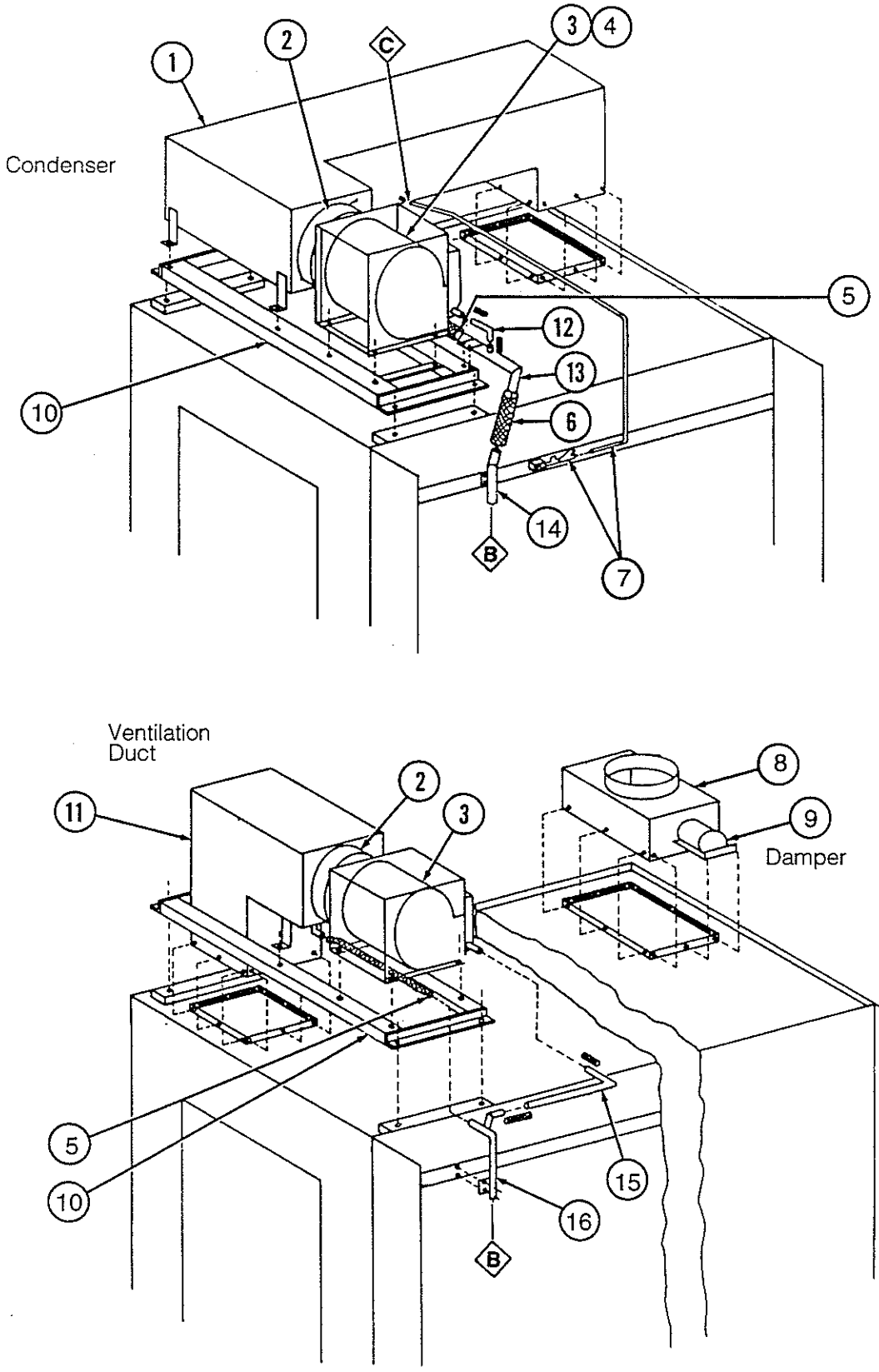


Figure 8-24. Vent Options

FIG. & INDEX NO.	PART NUMBER			SVC	DESCRIPTION	UNITS PER ASSEMBLY			
7	P	117950	755		THERMOCOUPLE	1			
8-24					VENT OPTIONS				
					Condenser Assembly	X			
					Damper Assembly		X		
					Ventilation Duct Assembly			X	
1	P				CONDENSER	1			
					• FILTER (not shown)	1			
2	P				SEAL (Rubber)	1		1	
	P	117951	443		CLAMP	2		2	
3	P	117950	502		ASSEMBLY, Fan (w/o Motor)	1		1	
4	P	117950	232		MOTOR, Fan, 1.5 HP, 3 PH, 1800 RPM for 208/230/460V (not shown)	1		1	
	P	117950	250		BELT, Fan	1		1	
5	P	117952	305		HOSE, Flexible Drain	A/R			
6	P	117952	307		*HOSE, Connector*	A/R			
7	P				ASSEMBLY, Water Inlet	1			
	P	117950	177		• STRAINER			1	
	P	117950	173		• VALVE, Solenoid, 1/2", Water			1	
	P	117950	174		•• KIT, Repair			A/R	
	P	117955	186		•• COIL, Spare			A/R	
	P	117950	216		• VALVE, Swing Check			1	
8	P	117959	138		DAMPER		1		
9	P	117951	125		MOTOR, Damper (not shown)		1		
10	P				SUPPORT, Mounting	1		1	
11	P				ASSEMBLY, Duct, Ventilation			1	
	P	117950	713		BELTS, Fan, Drying Blower				
	P	117950	803		LUBRICATOR, Automatic Perma	24			
	P	117951	095		BEARING, Pillow Block (for Blower Fan)	2			
	P	117951	444		GASKET, Blower	1			
	P	117950	613		NOZZLE, Spray	1			
12					ELBOW, Drain	1			
13					ELBOW, Drain	1			
14					ELBOW, Drain	1			
15					ELBOW, Drain			1	
16					ELBOW, Drain			1	

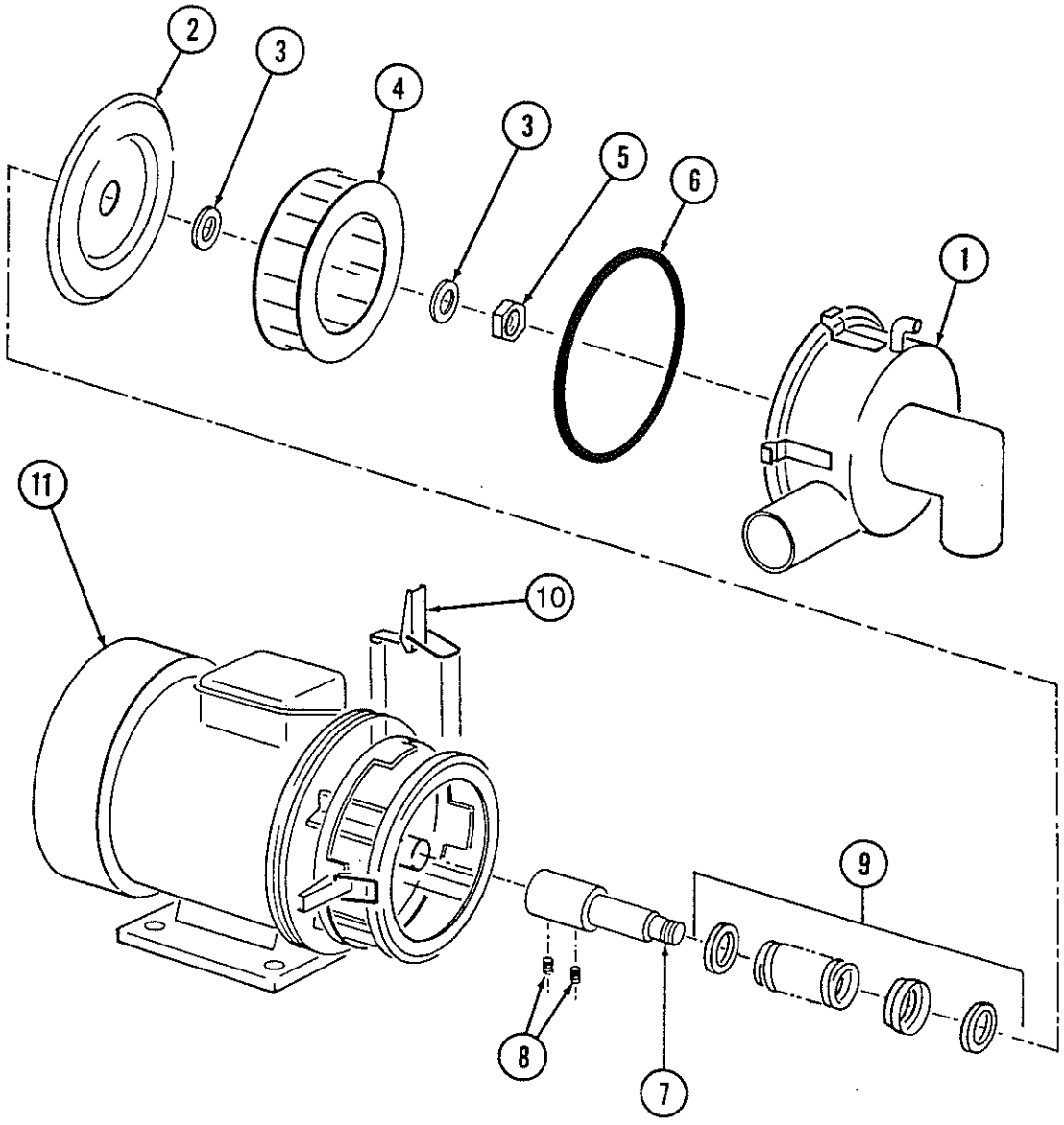


Figure 8-25. Pump Assembly

FIG. & INDEX NO.	PART NUMBER			SVC	DESCRIPTION	UNITS PER ASSEMBLY			
8-25	P	117950	135		PUMP ASSEMBLY (208V, 3 PH) (up to 82107)	X			
					PUMP ASSEMBLY (240V, 1 PH) (up to 82107)		X		
		117950	358		PUMP ASSEMBLY (from 82108)				
1	P	117950	357		COVER, Pump (up to 82107)	1	1		
		117950	150		COVER, Pump (from 82108)				
2	P	117950	144		FLANGE, Sealing	1	1		
3	P	117950	157		WASHER, Flanged	2	2		
4	P	117950	160		IMPELLER	1	1		
5	P	117950	158		NUT, Impeller, 3/4-16, LH	1	1		
6	P	117950	145		O-RING	1	1		
7	P	117950	155		SHAFT, Impeller (up to 02/87)	1	1		
	P	117951	009		SHAFT, Impeller (up to 09/21/89)				
	P	117951	442		SHAFT, Impeller (from 09/21/89 to 3626490XXX)				
	P	117951	513		SHAFT, Impeller (from 3626490XXX)				
8	P	117959	210		SETSCREW, 5/16-18 x 5/16" Lg.	2	2		
9	P	117950	142		ASSEMBLY, Mechanical Seal	1	1		
	P	117951	518		ASSEMBLY, Mechanical Seal (from 3617990XXX)				
10	P	117950	151		LATCH	4	4		
11	P	117950	131		MOTOR, 7-1/2 HP 208/230/460	1			

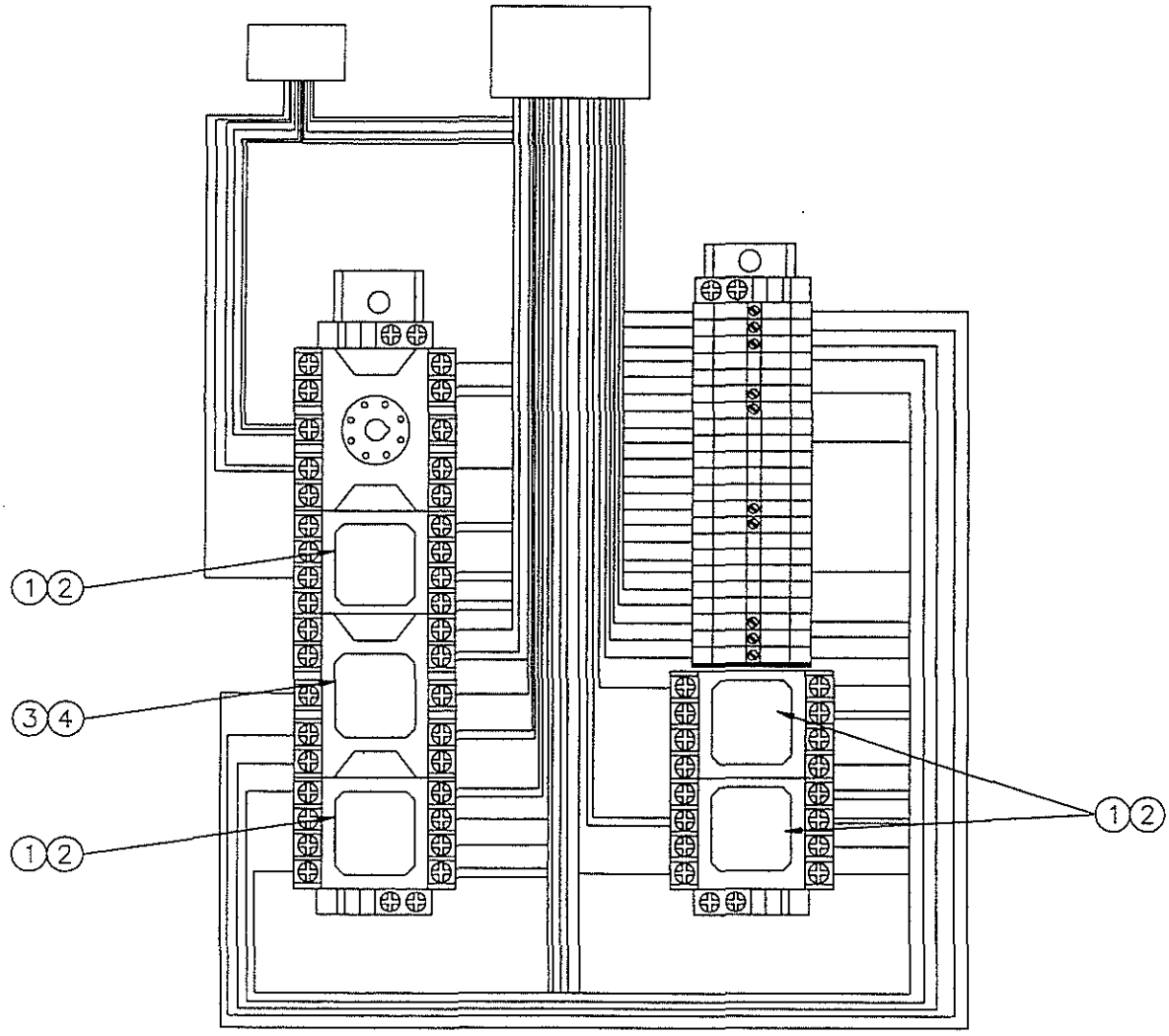


Figure 8-26. Distribution Box Assembly

FIG. & INDEX NO.	PART NUMBER			SVC	DESCRIPTION	UNITS PER ASSEMBLY
8-26					DISTRIBUTION BOX ASSEMBLY	X
1	P	117950	662		SOCKET, 2 Poles	3
2	P	117950	112		RELAY, 2P2T	3
3	P	117951	051		SOCKET, 3 Poles	1
4	P	117950	113		RELAY, 3P2T	1